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THE VETERINARY JOURNAL

EDITED BY

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Professor of Veterinary Medicine and Surgery in the Liverpool University Veterinary School; Past President of the Royal College of Veterinary Surgeons.

THE

VETERINARY JOURNAL.

JANUARY, 1905.

Editorial.

ANOTHER year has rolled by, the thirtieth of the existence of the VETERINARY JOURNAL, and on its birth day of 1905 we again make our bow to the profession. During the past year changes have taken place, gaps have been left in our ranks, and some well-known faces will be seen no more, although their memories will always remain.

The management of the Editorial Department has again undergone a change, as owing to pressure of business our esteemed co-editor, Professor W. Owen Williams, has reluctantly felt himself obliged to resign the post which he has so ably occupied for so long. Although no longer taking the leading part in the conduct of the JOURNAL, we have the pleasure of informing our readers that Professor Williams has not altogether severed his connection, and we hope from time to time to be able to present them with communications from his pen, as Professor Williams possesses a clear and lucid style of expressing himself, and furthermore, is not afraid of saying what he thinks.

To fill the existing vacancy on the editorial staff we have obtained the services of Professor F. Hobday, F.R.C.V.S., F.R.S.E., late of the Royal Veterinary College, London, and trust not only to keep the JOURNAL up to the standard we have always maintained, but to improve upon it.

One of the most momentous events in the annals of our profession, and one which is bound to effect a far-reaching change, is the removal of the New Veterinary College from Edinburgh to Liverpool and its incorporation with the University of that city. Rightly or wrongly, we have always considered the move one in the proper direction, and in spite of a certain amount of opposi-

tion, which at one phase of the proceedings almost verged on the ridiculous, the migration has been effected and the Veterinary School of the Liverpool University was formally opened on December 13, 1904, by the Right Hon. Walter Long, President of the Local Government Board.

A certain section, both of the supporters and opponents of the incorporation scheme, appear to think that its only object is the dignity a university degree may give to the future veterinary practitioner, some maintaining that it would be to his advantage and others ridiculing the idea. We confess that, although fully in favour of the scheme, we are of opinion that the possession or not of degrees, honours, &c., does not make an atom of difference to the state of any professional man's ledger, or for the amount that after his demise he will "cut up for." The public rarely stop to think or enquire what a man's degrees are. They do not ask if a lawyer is an LL.D. of Oxford or Cambridge, as long as he can get their money back for them or keep them out of gaol, and it is the same with a doctor or veterinary surgeon. So long as he can cure them or their animals they do not care a brass button whether he is an M.D. or a F.R.C.V.S., or, indeed, whether he has any qualification at all. A lawyer is a *lawyer* and a medical man a *doctor.*

With the public, as regards professional distinctions, the feeling is much the same as with the irate old Scottish bachelor in one of Dean Ramsey's stories, who, before engaging a new cook, applied personally, as to her attainments, to the former mistress, the wife of a divine. The good lady began a long panegyric on the good moral qualities of her former servant, but was quickly interrupted by her visitor, who exclaimed, "D—n her morals, madam; can she make haggis?"

The public do not want the morals, they want the haggis; but, as all the world know, the skill and science requisite to turn out this toothsome dish to perfection takes time to acquire under expert tuition, all of which means *money*, and this with the veterinary schools is just where the shoe pinches. That they can educate pupils up to a high standard we do not deny for an instant; and, if they are able to obtain adequate government or private support, they could do so; but, as this appears to be impossible, we think that the New Veterinary College of Edinburgh executed a wise move when it went *to where the money was.* Whether we are right or wrong, time only will show.

Another change that we must notice is in the Board of Agriculture in the retirement of the chief veterinary officer, who has

ably filled an exceedingly onerous post for a number of years, and who will carry with him the good wishes of all who have ever, either in a public or private capacity, had to transact business with him. His successor, although, comparatively speaking, a young man, is one who has already made a name for himself in many parts of the world, and we are confident that the mantle has fallen on no unworthy shoulders.

The future of the veterinary profession is one that is open to much discussion. The motor car, without doubt, has come to stay, and that it will, to a certain extent, take the place of horse traction cannot be denied even by its most rabid opponents; but that, as prophesied by certain melancholy Jeremiahs, the horse will be as extinct as the Dodo, and in the dictionaries of the future the term "veterinary surgeon" will be described as "a man who treated the ailments of an extinct animal called the horse," we do not for a moment agree. True, the condition of things will change, as, indeed, they have done even in the quarter of a century of our professional career, for when we first began a veterinary surgeon who knew anything beyond the ailments of a horse or cow was looked on as a *rara avis*.

New fields have opened out, and in France, the home and birth-place of motors, there is no falling off in the number of students at the colleges. Frenchmen are not fools, and if there was not a likelihood of earning a living they would not embark on a long and expensive course of study. We think that the day is far distant when we shall be obliged to take the advice of the American veterinary surgeon and go through a post-graduate course of "motor repairing." Veterinary surgeons *who are suitable* for the career are still required for the army, and day by day the Colonies open up remunerative fields for those fit to enter them.

As in all professions, there are failures, and in none are special qualifications more required than in ours. Unless a man has special aptitude, which is born in him, he had better take to some other walk in life; if he has not such aptitude he is foredoomed to disappointment; but if he has and has ordinary luck, we are of opinion that as a profession it is a long way yet from being played out.

INTERNATIONAL VETERINARY CONGRESS.

BELOW is given the synopsis of the Eighth International Veterinary Congress, to be held in September next in Hungary, at Buda-Pesth. The importance of the value of an international interchange of ideas on all subjects connected with the progress of veterinary work cannot be over estimated, and in the full programme, which can be obtained free upon application to the Secretary, is given a preliminary list of the authorities who have already promised papers or to take part in the discussions.

The programme embraces a very wide range of subjects, and there is no doubt that the Congress will be as enjoyable and far-reaching in its results as have been the previous ones. English members of the profession are cordially invited, and for their especial benefit interpreters will be provided and translations of the various papers will be rendered in their language.

Austro-Hungary, too, offers at Buda-Pesth, Vienna, and other places, opportunities to visit some of the best-equipped and most noted veterinary schools and breeding studs in the whole world, and members of the profession who can arrange their annual holiday to include a visit to the International Veterinary Congress will find themselves returning to England with greatly widened ideas and the satisfaction of having passed a pleasant and profitable holiday.

EIGHTH INTERNATIONAL VETERINARY CONGRESS AT BUDA-PESTH, 1905.

Papers will be read, and discussions carried on, in Hungarian, German, French and English.

Representatives or delegates of Governments and high authorities, of Universities, of Veterinary and Agricultural Colleges, of Hygienic Institutes, of Veterinary and Agricultural Societies, and also Veterinary Surgeons and Physicians, can take part in the Congress as ordinary members; while farmers and pharmaceutical chemists, who do not rank, except as delegates, among ordinary members, can attend the discussions as members extraordinary.

The subscription for a member, ordinary or extraordinary, is 20 crowns = 17 shillings. Ladies' tickets can be procured for 10 crowns = 8s. 10d.

The members, ordinary or extraordinary, are entitled to take part in all meetings of the Congress, and to receive all notices, as well as the General Report, free of cost, whether they have attended the Congress or not. All members who give timely notice, so that arrangements can be made, will receive in advance the original text of the papers enumerated in the programme, together with an abstract in several languages.

Notices of intention to take part in the Congress, and enquiries concerning it, are to be addresed to the General Secretary's Office of the Congress (Buda-pesth, VII. Rottenbiller-utcza, 23); subscriptions, however, are to be sent to the Secretary's Office of the Royal Hungarian Veterinary College (Buda-pesth, VII. Rottenbiller-utcza 23).

DR. STEFAN DE RÁTZ, *General Secretary.*

WILLIAM OWEN WILLIAMS, F.R.C.V.S., F.R.S.E.

WILLIAM OWEN WILLIAMS, F.R.C.V.S., F.R.S.E., is a Yorkshireman by birth, having been born in Bradford a little more than forty-three years ago. He was quite a young lad when his late father removed from Bradford to Edinburgh to take over the principalship of the Royal (Dick) Veterinary College. After receiving his early education at the Edinburgh Royal High School and Edinburgh University, he entered as a student the New Veterinary College, which was founded by his late father in 1873, qualifying from that institution on April 20, 1881, fully six months before he had attained his majority. He then went to Alfort and studied under Professors Goubaux, Nocard and Trasbot, and in 1879 and 1880 was a pupil with Messrs. Stephenson and Elphick, Newcastle. On his return from Alfort he became assistant to his father, and a few years later Lecturer on Morbid Anatomy, Cattle Pathology and Canine Medicine at the New Veterinary College, Edinburgh. On April 29, 1886, he obtained his Fellowship Diploma of the Royal College of Veterinary Surgeons, and in March, 1897, was elected a Fellow of the Royal Society, Edinburgh. Since 1894 (when first elected) he has been a member of Council of the Royal College of Veterinary Surgeons, of which body he was elected President in 1902, being re-elected the following year; he is the only member of the profession now living who has been twice President. During his first term of office in 1901-2, owing greatly to his exertions, the then Secretary of State for War was persuaded to appoint a Committee to inquire into the condition of the Army Veterinary Department, and he was nominated a member of that Committee, travelling from Edinburgh at great inconvenience to himself to attend meetings in London; and during his second year of office as President of the Royal College of Veterinary Surgeons a new warrant for the Army Veterinary Department was brought out. That day was a red-letter one in the life of Professor Williams; he had fought long and well on behalf, not only of the A.V.D., but of the profession as a whole.

In January, 1900, at the special request of the War Office, he proceeded to New Orleans to act as veterinary adviser regarding the shipment of horses to South Africa during the Boer War, and as a result of the measures adopted on his advice the average landed in South Africa alive and well was over 97 per cent. Unfortunately, he contracted malaria and rheumatism in the unhealthy climate of New Orleans and had to return to England in such a serious state of health that for some time his life was despaired of.

For a number of years Professor Williams was veterinary officer to the Lothians and Berwickshire Yeomanry Cavalry, and at the present time he is Honorary Veterinary Surgeon to His Majesty the King.

He is the author of numerous publications on veterinary medicine and has been for several years editor of the VETERINARY JOURNAL, which position, however, he has been lately compelled to resign owing to pressure of business connected with the removal of the New Veterinary College from Edinburgh to Liverpool.

The events in connection with this migration are so recent that it is unnecessary to repeat them. Suffice it to say that, in spite of many difficulties and obstacles, the School was incorporated with the Liverpool University and formally opened on December 13, 1904, by the Hon. Walter Long, M.P., President of the Local Government Board.

THE SCIENTIFIC AND COMMERCIAL VALUE OF PEAT MOSS.

A REMARKABLE INDUSTRY.

BY LIEUT.-COL. NUNN, F.R.C.V.S., F.R.S.E., D.S.O., C.I.E.,
ARMY VETERINARY DEPARTMENT.

THE utilisation of peat has for many years past attracted the attention of both scientists and practitioners, a considerable surface, viz., 9½ million acres of bog-land, existing in the United Kingdom, the largest being in Ireland, next Scotland, and lastly, England and Wales. The great bulk of the Irish and Scotch Bog, however, is only suitable for fuel. It is true that there is a certain economical value in turf bogs which provide fuel, but being of a low heating value, it is only used for domestic purposes and small local industries, and it has been sought, "unfortunately with but poor success up to the present," to so treat the turf that it could be utilised as a heat producer for manufacturing purposes. If this could be done, the change that would take place in some of the poorest and most desolate parts of Ireland and Scotland would be marvellous, as there would be an almost unlimited supply of fuel as large as the English and Welsh coalfields, close to the surface and at hand, which could be obtained without costly mining operations.

The formation of peat only takes place in cold climates, vast deposits being found in places in the north of Europe, one of the best known in the United Kingdom being the Bog of Allan in the King's and Queen's Counties in Ireland; Chat Moss, in Lancashire, through which, by a most skilful piece of engineering, the London and North-Western Railway runs; and the celebrated Yorkshire Moors.

It is not realised, however, by many that there are different classes of peat, and even different grades of these classes, some of which can be only used for certain purposes, and, furthermore, that different sorts may exist in the same area. The value varies considerably, but in passing it may be remarked that most of the peat from these 9½ million acres is only fit for fuel, fish-curing, whiskey distilling, and sanitary purposes; the peat available for other uses, such as bedding for animals, packing fruit, eggs and butter, and textile fibres, is, compared with the total, comparatively small in quantity, although there need be no fear of its being exhausted during this century at all events.

The formation of peat is a somewhat complicated and peculiar

process. It is formed from the roots of heather, ferns, bracken, and the bastard cotton, but chiefly from the *Sphagnum palustre* of Linnæus, a moss which is common on all moist, peaty surfaces in Europe and many parts of North America. The moss continues growing upwards from the points of the shoots, while the lower extremities die, thus forming a thick matted mass of vegetable matter; in its death, however, the sphagnum moss emits an acid from its root which acts as a preservative on the whole mass. Other forms of vegetation enter into the formation of peat, cotton-grass (*Eriophorum augustifolium*), horse-tail (*Equisetum*), bog myrtle (*Myrica gale*), and certain heathers and sedges, but these spoil it for bedding.

When the peat forms on land in which there are springs the water accumulates between it and the soil, raising the bed of vegetable matter, which is light, and floats it up. Sometimes it is carried a considerable distance and causes great damage, a notable instance taking place at Annan, in Dumfriesshire, in the middle of the eighteenth century, and several in Ireland within more recent years. The conditions that favour the growth of peat are a number of springs in the soil, which should be flat, or a hollow surrounded by hills, and a cold, moist climate. This latter is essential, as in a warm or tropical one, after the death of the plant decay takes place so rapidly that it is disintegrated and there is not sufficient time for peat to form.

When the peat accumulates on a level surface or a slope in which there are but few springs it is comparatively dry, and is then known as peat moss, a notable example of which is found in the Flanders Moss in Stirlingshire, which at one time covered over 4,000 acres. The bed on which it rested was excellent alluvial soil, and a portion has been reclaimed for agricultural purposes by cutting out the peat and floating it out on a stream to the sea. This, however, was done many years ago, when the commercial value of peat moss was not known, otherwise such a large quantity of valuable raw material would not have been wasted.

The depth of peat bogs greatly varies, from a few inches to 30 and 40 feet in the case of the Bog of Allan, and some others in Ireland, but the peat moss is only found on the surface. In the deeper bogs the process of the transformation of plant-life into coal is more advanced, and the lower strata partake more of the nature of lignite than peat, being consolidated, and of a dark brown or nearly black colour. Peat of this class is chiefly used for fuel.

Peat soil is peat in a state of decomposition, and on this corn and

other crops can be grown. The process is facilitated by draining the bog, dressing its surface with earth and lime, and then ploughing or digging it in. This process has been extensively employed in parts of Ireland, Scotland and Lancashire, corn, potatoes and cereals being grown on peat bogs twenty feet deep.

Few trees, however, will grow on such soil, except spruce, silver-birch, and one or two kinds of willows. Woody peat is composed of branches, trunks and roots of trees, with the shrubs and plants that have grown in between them, that have been so long in the water that they have rotted and turned into a soft blackish-brown mass, that can be cut with a spade. It can be used for manure, fuel, or for gardening purposes, and indeed is so employed in the valley of the Kennet, in Berkshire. It is also burned for its ashes in both England and Holland, as they contain a large quantity of alkali.

The value of peat as a fuel greatly varies, the best being the dark brown compact sort that is obtained from the deep strata of old formed bogs. Peat contains incombustible matter in varying proportions, from 5 to 15 per cent., much of which is due to the mechanical admixture of sand, and when air-dried there is from 8 to 20 per cent. of water retained.

The average composition is generally given as—carbon 52 to 66, hydrogen 4·7 to 7·4, oxygen 28 to 39, and nitrogen 1·5 to 3, per cent.; but a recent analysis of a sample from the Yorkshire moors of the British Peat Moss Litter Company works out at—carbon 55·27, hydrogen 5·27, ash 2·22; thus it will be seen that it varies very greatly according to the locality from which it is obtained.

Air-dried peat has a heating value of from 3,000 to 3,500 units, but when dried artificially at 100° F. and with only 4 to 5 per cent. ash, it will amount to about 5,200 units, or about a quarter to a third more than wood. The light variety of peat moss, when dried, is inflammable, igniting at 424° F., but the denser parts require a higher degree, especially when compressed, or made into patent fuel. The great drawback to general use is its great bulk, being, for steam-raising purposes, from eight to eighteen times that of coal. When dried good peat moss shrinks a great deal, good specimens having a specific gravity of 0·25, against that of the more advanced in the process of the formation of coal, 1·25.

To veterinary surgeons and those interested in horses and other domestic animals the value of Peat Moss as a bedding material and a manure is, however, its most important use. Good wheat straw is,

of course, excellent, but owing to its high price and the difficulty of obtaining it in places, horse and stock-owners have for years past been driven to look for substitutes. The commonest of these have been sawdust, wood shavings, sand, in places bracken, fern, and pine leaves, but the most satisfactory and most general is Peat Moss, the use of the others only being practicable in certain localities where they can be easily and cheaply obtained.

It is only the light spongy moss on the surface of the bog that is formed from the sphagnum moss that can be used for bedding—the formed peat from the deeper parts being too hard and consolidated, and not possessing sufficient absorbing properties, which are the chief consideration. M. Chardin (*Hygiene du Cheval de Guerre*) has demonstrated this to be three to three and a half times its own weight, whereas straw will absorb only its own weight of urine. This power of absorption of Peat Moss is that at which it can be used effectually, but in reality it will take up from eight to ten times its own weight, but it then becomes sodden and unfit for use.

The following are the average absorbent properties of the different substances commonly used for bedding down animals:—

	Number of Litres of Water absorbed per 100 kilogrammes.		Number of Litres of Water absorbed per 100 kilogrammes.
Peat Moss	**600**	Fern	222
Sawdust, Poplar	435	Rape straw	200
„ Scotch fir ...	420	Dead leaves	200
Bean straw	330	Pine „	200
Barley „	285	Heather	145
Pea „	280	Furze	111
Turf	275	Light mould	50
Oat straw	228	Chalk	40
Wheat „	222	Sand	25

Peat Moss also has the important property of being able to absorb six and a half times as much ammonia as wheat straw, and twenty-four times as much as sawdust. As every one knows who has had anything to do with horses, it is exceedingly difficult to prevent ammonia accumulating, in even the best ventilated stables. and this, even of itself, makes Peat Moss most valuable from a sanitary point of view.

This property makes it peculiarly suitable for use in under-

ground stables in towns, which are always difficult to ventilate, and in cowsheds where the cows are milked in their stalls. Milk, as is well-known, quickly undergoes change, and easily becomes unfit for human food, and it is most undesirable that it should be exposed to an atmosphere even in the very slightest degree contaminated, for even if no actual disease is produced, it is anything but pleasant to imagine that an important article of food has been in proximity to such things.

One of the first specimens of Peat Moss put on the market in England as a commercial commodity was a foreign material, and was known as "German Peat Moss Litter," which was enough to condemn it at once in the eyes of the conservative Britisher as a new-fangled foreign innovation. The use was not, and indeed is not even now, properly understood, for as late as 1896, a well-known cavalry officer, in a book on stable management, published in that year, said about Peat Moss: "Moreover, it is the most dreadful stuff to use in a stable, as without the greatest care being exercised *it very soon stops up the drains*, and so is a source of constant expense and inconvenience, the smaller particles get washed down with the water, and, settling in the drains, block them up."

The author of this work is a well-known horse-master, and most of the advice he gives is good and valuable, but the above passage shows that he utterly fails to grasp the difference between a straw and an absorbent bedding. With the latter DRAINS ARE NOT NECESSARY, and if there are any in the stable they had better be at once hermetically sealed.

During the South African War a remount depôt was established at Southampton, in which usually about 200 horses were accommodated awaiting embarkation. For this purpose one of the goods warehouses of the Dock Company—"a large iron shed"—was rented. The building had a cement floor, but there was no system of drainage, and a difficulty arose, as it could not be drained into the dock for sanitary reasons, and the expense of connecting it with the town sewerage system would have been prohibitive. The difficulty was solved by doing away with straw and adopting an absorbent bedding. In this case Peat Moss was largely used, as there happened to be an unlimited supply to be obtained at a nominal cost. The plan was most successful, for although the depôt was in existence for nearly two years from first to last, there was never any complaint, although there was an entire absence of any system of drainage of any sort or description.

In this case, however, there was plenty of intelligent labour, and the system and difference between the method of using straw and absorbent bedding fully explained to all concerned. The instructions given were scrupulously carried out, and any damp or soiled Peat Moss at once removed and replaced with fresh, the whole being well shaken up and exposed to the air daily.

Of course, a deep bed of good wheat straw up to the horse's knees, with a plait behind him, looks well, but it is not every horse-owner who can afford to pay for appearances. This, no doubt, is to a considerable extent one of the reasons for a certain prejudice against Peat Moss, which at first may seem to give the stable a somewhat cold and comfortless look; but it can be obviated by spreading a thin layer of straw on the top, and is merely a matter of fancy. In commercial studs, where appearance gives way to utility, its use is every day getting more common. In the *Financial Times* of May 7, 1903, in an article entitled "A Matter for the War Office," the writer enters fully into the economy of its use, and calculates that a saving of £1 per head per annum for every horse in the army might be effected; and the Westminster City Council have found that for 150 horses Peat Moss came to £4 9s. 4d. a week, against £7 3s. 9d. for straw. Their engineer and surveyor points out that it is practically incombustible. for it will only smoulder when freshly laid down, and not even that after being in use for two or three days, reducing to a minimum the danger of fire from the carelessness of horse-keepers.

In the use of Peat Moss certain precautions have to be observed. Being so very absorbent, it takes up a large quantity of water from the atmosphere, and therefore the bales should be kept in a dry place and not opened till required for use, when, if they have a musty smell and feel damp, they should be spread out in the air.

In putting down a bed about one hundredweight is required for each horse, and it should be spread evenly over the floor of the stall, but it is a great mistake to put it down too thickly. The quantity afterwards required would be about 28 lbs. a week, which is spread out daily when required, as the soiled portions are removed. The droppings should be removed at least every morning, and oftener if practicable; also any portions that are damp from urine, fresh moss being put down. The whole should then be raked over and mixed up, afterwards being brushed on one side against the walls of the stall or loose-box to allow of its getting aired, but there is no occasion to take it out of the stable into the open air like straw. At night the bedding should

be brushed back on to the floor of the stall, gone over with a rake, and if necessary a small quantity of fresh peat moss scattered over the bed. This of itself is an important consideration in favour of its use in the army. The allowance of straw per horse per diem, viz., 8 lbs., is but scanty, and officers always have a difficulty in ekeing out the amount by carefully removing the very dirty portions and drying the remainder. The drying is done in the open air, and in the more modern barracks litter-sheds for its exposure to the atmosphere are provided. In the older stables the bedding has in fine weather to be spread out in the open, and in bad weather heaped up in the centre gangway, and, as anyone can imagine, it is the reverse of a sanitary state of things to have a heap of damp, reeking litter standing in the middle of the stable. Not only is it detrimental to the health of the horses, but the ammonia fumes act injuriously on the saddlery and harness, causing the steel-work to rust and the leather to perish. In the process of removal outside every day the loss of straw is large, and this is greatly increased in windy weather, when a barrack-yard is littered over with it. Furthermore, the erection of litter-sheds means a considerable capital sum sunk which might be saved by the introduction of Peat Moss Litter.

In using Peat Moss the soiled litter should be put in a heap and water, or, better still, liquid manure, poured on it till saturated, when the heap should be flattened at the top and covered with fine ashes or earth and the whole left to rot, which will take place in about two months.

Dr. Watts gives the composition of straw and Peat Moss Litter manure as follows :—

	Straw.	Peat Moss.
Water	75·42	62·53
Organic matter	16·53	29·14
Phosphates	·96	2·56
Alkaline salts	4·43	3·60
Insoluble matter	2·66	2·17
	100·00	100·00
Containing nitrogen	·61	1·24
Equal to ammonia	·74	1·50

Many agriculturists and gardeners prefer Peat Moss to straw manure, and a ton of Peat Moss properly treated is equal to seven of straw. There is also a saving of labour in its use, as the moss, when

properly rotted, has turned into a species of compo, and there are no long straws to be dug into the ground—an important fact in the case of gardens.

In the stables of the Leicester Tramway Company it was found when straw was used that there was a difficulty in getting the manure removed, whereas the Peat Moss had a ready sale, and a profit of £68 17s. 6d. was made during the year. The same occurred in Paris, where at first there was a great prejudice to its use as a manure for growing vegetables amongst the market gardeners round the city. The Paris General Omnibus Company, who were large users of Peat Moss litter for their horses, instituted some experiments to settle the point.

Equal quantities of wheat and beetroot were grown on different plots of land, which were of equal size, the soil the same, and they were treated in identically the same fashion, excepting that some were manured with Peat Moss manure and others with straw manure. The results of these experiments, which were carried out by MM. Muntz and Lavalard for the Company, were :—

G.S.L.

	Beetroot.	Wheat.
Straw manure ...	30·000 kilogrammes	1·033 kilogrammes.
Peat Moss manure	40·060 ,,	1·234 ,,

These observations have been confirmed by others, and there is now a ready sale for it.

Peat Moss is not used only for fuel and bedding for horses, as of late years it has been discovered that it can be adopted for a variety of purposes. What is known as moss litter dust is now largely used in cow-sheds in towns, in the grips behind the cows, also for pigs, dogs and poultry. With pigs it is distinctly of sanitary advantage, the humic acid in the peat neutralising the offensive smell of the excrements in a most remarakble manner, which will strike anyone on contrasting a piggery where straw is used with one in which Peat Moss is employed; and with poultry and dogs it is said by many experienced fanciers to keep away lice and fleas. It is also, on account of its absorbent and antiseptic properties, largely used, instead of dry earth or ashes, by many sanitary authorities for conservancy purposes.

Within the last few years a new use for Peat Moss dust has arisen for packing purposes, especially fruit, large quantities being imported from Madeira and the Canary Islands. Formerly fruit was packed in sawdust obtained chiefly from Norway and Germany, and although it did well enough for the tougher-skinned varieties, it was not suitable for

the more delicate, such as tomatoes and grapes, the thin skins of which were liable to be injured by the sharp splinters of the particles of sawdust. Peat dust, being of a velvety softness, was found to be an admirable material for this purpose, and furthermore, had the advantage of being easily blown away with a hand-bellows when the article was exposed for sale, an impossibility with sawdust, which had to be washed off. This not only spoiled the fruit in appearance, but made it difficult to keep good for any length of time, especially in the hot weather.

It has been found that filtration through fibrous peat is the most satisfactory way of treating certain descriptions of sewage. In the towns in which the woollen manufacture is carried on a large percentage of grease from the wool gains access to the drains, and sewage of this nature is most intractable to treat, so as to get an effluent anything like pure enough to be allowed to flow into rivers and streams with any degree of safety from a sanitary point of view. This was particularly the case with the town of Bradford, the authorities of which, after a long series of experiments, hit on the plan of utilising Peat Moss, with, we believe, complete success.

As need hardly be mentioned, Peat Moss forms the matrix of "Molassine," a feeding material composed of molasses and Peat Moss, which is daily getting better known and more popular with stock-owners, both in England and abroad.

Peat Moss is also being used as a fibre for paper-making, especially brown packing paper.

Peat Moss fibre is now used as a substitute for cotton or wood wool for surgical dressings. It is prepared in the form of a wool and in sheets, and is claimed to have antiseptic properties. The *Lancet* says: "For padding splints nothing better can easily be imagined; one gets an elastic pad which has no tendency to felt, and which does not get sour or ill-smelling, however badly it is treated." Peat Moss dressings are largely used on the Continent, more particularly in France, where many authorities prefer it to any other material, and in which country it is by several eminent canine specialists preferred to all other surgical dressings.

The Peat Moss industry is to-day chiefly worked by the British Moss Litter Company, who own over 10,000 acres of peat-land in Lancashire, Cheshire and Yorkshire. The largest property is situated between Doncaster and Goole in Yorkshire, in the low-lying country known as the Island of Axholme, the scene of the novel, "A Manuscript Found in a Red Box." Medge Hall was the first Peat Moss factory

opened. Thorne has a population of some 5,000 people, and the surrounding country is actually below the sea-level.

The district is about as unlike an English landscape as could well be imagined, and the traveller might fancy he was suddenly transported into the middle of Holland. The flat, sluggish canals, with lumbering square-sailed barges, or, as they are locally termed, "Keels," red-tiled houses, and wind-mill pumps, are typically Dutch, and to make the delusion more striking, there is a considerable Dutch colony in the district.

The first Dutch emigration into Yorkshire took place in the seventeenth century, when the great engineer, Ver Muzden, brought over a number of Hollanders, and drained part of the bog, 70,000 acres of rich arable land being reclaimed from the waste. The present colony, which numbers about 100 workmen and their families, was first brought in by the British Moss Litter Company in 1887, as not only was English labour difficult to get, but it was unsuitable, as the peat-cutting requires a technically skilled workman. Though digging turf seems a simple process, it requires a practised hand to perform it rapidly and economically, which the Dutchman was able to do. There are now a considerable number of English employed, who have learned the art, but even now they do not work in the same fashion as the Dutch. The directors of the Company do not employ these foreigners from any motives of economy, for they are paid from twenty to thirty shillings a week, but simply because suitable English labour is not available.

These Dutchmen, with their families, are housed in a village built for them by the company, which in its characteristic features is as different from an English one as the Chinese quarter at San Francisco. Although a fairly quiet and law-abiding community, it was found that their manners and customs were disliked by their neighbours, and it was better to locate them by themselves. The village, or row, consists of a street of brick cottages, and is self-contained, having a shop and bakery of its own. The most casual observer will notice the peculiar, fair-haired Dutch cast of countenance of the children, and the "Dutch build" of the vrows, which, with the surrounding landscape, complete the delusion that he is not in England. The occupation of turf-cutting is a healthy one; indeed, no weak man could lift the turves, and even in the mills, in which there is a considerable amount of dust flying about, pulmonary disease amongst the workmen is unknown, a particularly strong testimony to the healthy properties of Peat Moss.

The peat harvest goes on all the year, except during frost, when it is impossible to dig out the turves owing to the hardness of the ground. They are cut out in bricks about sixteen inches in length, and first laid out in what are known as "Dutch or English Walls," to dry afterwards in stacks, where they are kept till required. Even the making of the walls requires skill, for if not put up properly they would remain as damp as a sponge for an immense time.

The Dutchman works differently from the English, with an instrument called a graver, and singly, loading the peats on a barrow, which when full he takes to the "wall." Englishmen work in pairs, one man cutting the turves with a sharp spade, and the other carrying them off on a fork; but as the blocks are eventually broken up there is but little difference in the two methods, except that the Dutchman's work looks somewhat neater and the squares are more regular.

On the Yorkshire property there are about 200,000 tons of cut turf stacked and ready for carrying to the mills, which stock would at the present rate of consumption last without renewal for three years, but the practice is to make up what is taken away, so as to be prepared for the eventuality of a bad harvest or other unforeseen occurrence. In going over the moor the stacked peats present a curious sight, varying from the newly cut, which are of a yellow colour, to the older ones weathered to a darker tint on the outside only. There are about fourteen miles of canals on the property, and when possible the peats are conveyed to the mills in barges, but during dry weather there is not always water enough, and then they are loaded on trucks on a portable line of tramway that is put down when required, of which there is altogether about thirty miles on the property. The Company, besides, owns its own railway sidings in direct communication with its various mills.

As far as possible the peats are sorted out at the stack before loading, but they are again picked over on arrival at the mill. The process they are put through is a somewhat complicated one, but briefly it amounts to breaking up the blocks of peat into fragments, fibres, or dust, as required for the various products turned out by 40-horse power machinery, consisting of tearers, pulverisers, and combing machines specially designed by the engineers of the Company.

Peat Moss litter is passed through the tearer to a powerful press, steam-driven in some mills, by hydraulic power in others, and is then made up into bales ready for transport. By this process no less than forty huge bales of Peat Moss litter per hour, or 120 tons per day, can

be turned out ready for the market from a single factory of the Company. The dust for packing purposes is from the tearer passed through the disintegrator, and comes out in the form of an almost impalpable fine powder, and is packed into sacks or bales as required. As an instance of how different parts of the world are placed under requisition to help to manufacture an article, it may be mentioned that in this case a bale of Peat Moss litter is composed of peat dug out of a Yorkshire moor, the packing round it is jute grown in Calcutta and the neighbourhood and manufactured in Dundee, wire manufactured in England and Holland, and the wooden battens are cut in the forests of Norway.

Properly to appreciate the magnitude and value of this novel and unique industry, it is necessary personally to inspect this huge property, its industrious workers scattered over miles and miles of land formerly counted valueless, and now the source of a large and rapidly increasing commerce, and its adjacent factories, giving a remunerative and healthy livelihood to hundreds of people. The men who, in the face of much opposition and prejudice, have thus founded what is, we believe, destined to become an industry of great importance to the country, are worthy of praise and encouragement. There are few veterinary surgeons who would not find it of interest and value to them to make themselves personally acquainted with the qualities and uses of Peat Moss in their practice; and now, in the course of a very short time, it may be confidently anticipated that all horse-owners—especially those on a large scale—will realise that both from an economic and hygienic point of view, we possess in Peat Moss litter a commodity that we can no longer afford to ignore.

THE annual ball of the students at the Alfort College took place at the Hotel Continental, Paris, on January 7, 1905, under the presidency of M. Chauveau, member of the Institute and Academy of Medicine and Inspector of Veterinary Schools.

NOTES ON A CASE OF FRACTURE OF THE CRANIUM OF A HORSE.

BY CAPT. F. W. WILSON, M.R.C.V.S., A.V.D., EDINBURGH.

A TROOP horse, aged 10 years, with five years' service and no record of any serious illness, was reported to have reared up and fallen over backward on the road. The animal became immediately unconscious and exhibited intense shivering, and expired in about half a minute. The horse had a reputation for rearing, plunging, and being generally intractable. The casualty occurred at an out-station late in the afternoon, and the autopsy was not made until the following morning.

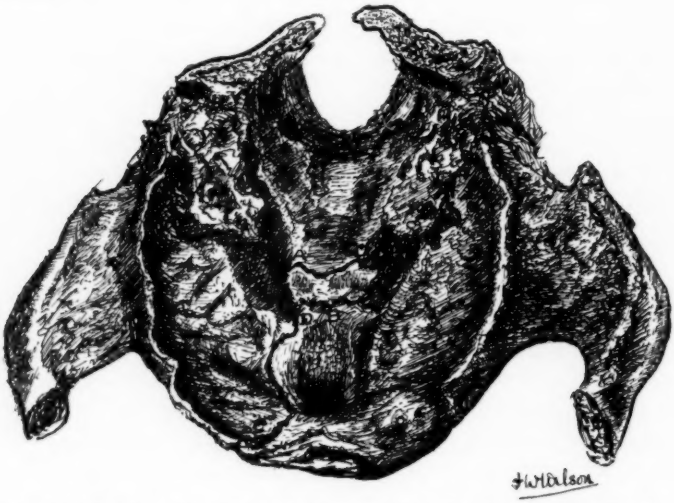


FIG. 1.—Portion of base of the skull, showing fracture (A, B, D, E) between the basilac process of the occiput and the body of the sphenoid.

The body was lying on the left side, *rigor mortis* had set in, blood had issued from both ears and nostrils, and bruises to the occipital crest and to the region of the second cervical vertebra had been sustained. On the dissection of the latter region an injury causing a transverse separation, to the extent of a quarter of an inch of the fibres of the ligamentum nuchae, had been sustained at the left border over the atlanto-axial joint; the adjacent muscles were hyperæmic, soft, and on section revealed blood extravasations, almost black in colour.

The spinal cord and its membranes were examined at the atlanto-axial articulation. The meningeal vessels, particularly of the pia mater, were hyperæmic, and in the aveolar tissue of the latter patches of hyperæmia and punctiform hæmorrhages were abundant. The sub-

arachnoid fluid, though not measured, was in excess, and of a sherry colour, due to serous extravasation.

Considerable hæmorrhage had occurred in the tissues around the pharynx, this cavity and the lumen of the trachea being to a large extent occluded by blood-clots of an almost black colour.

The base of the skull was fractured between the basilar process of the occiput and the body of the sphenoid. The tubercles for the attachment of the rectus capitis anticus major and minor muscles had become detached, the result of the violent extension of the head on the atlas; this would be produced by the weight of the body being suddenly thrown on the occipital crest, and their separation was assisted by the proximity of the seat of fracture.

The fracture ran transversely oblique from behind downwards and forwards, and at its termination on the cranial surface of the sphenoid a flat piece of bone was detached, but not displaced, nor presenting a surface liable to injure the brain. The line of fracture inferiorly took a course along the entire edge of the right ala, close to the body of the sphenoid, and to the outer edge of the groove which accommodates the superior maxillary division of the fifth nerve, close to the cavernous sinuses; it then extended superiorly to the notch in the *foramen lacerum basis cranii*, over which passes the internal carotid artery. No injury to the internal carotid artery could be seen, and the local hæmorrhage was probably derived from the sub-sphenoidal sinuses; though, considering the intimate relation of the two blood systems at this region it seems almost impossible for the arterial to have escaped.

To Professor O. Charnock Bradley, M.R.C.V.S., M.B., Ch.B., F.R.S.E., I am indebted for the following description of injuries sustained by the petrous temporal bones:—

"Petrous portion of left petrosal temporal is broken off along an irregular line (horizontal in direction), on a level with the internal auditory meatus.

"Right petrosal temporal. A vertical fracture separating the mastoid and tympanic portions from the petrous.

"On both sides the hook-like extremity of the so-called pyramidal process of the squamous has been broken off, and, in the specimens, is attached to the petrosal temporal.

"The auditory bulla is completely destroyed on both sides."

The arachnoid and pia mater of the brain were in the same condition as observed in the cervical region. The sub-arachnoid fluid measured two ounces. A rupture (not attributable to a spicule of fractured bone) of the right middle cerebral artery, around which was a blood-clot of the size of a florin at the region of the right fissure of Sylvius, explained the hæmorrhage into the sub-arachnoid space. The brain substance was not altered in consistency, nor in any respect; each of the fourth ventricles contained about a drachm of claret-coloured fluid, and the choroid plexus was congested.

On the removal of the dura mater from the brain-case the ophthalmic arterial system showed localised hæmorrhages dotted about over the inside of the brain-case.

The ethmoid cells contained blood-clots, the cribriform plates transmitting a blue tinge through them when viewed from the cranial side. The hæmorrhage into the pharynx and trachea was probably derived from the nasal branch of the ophthalmic artery.

To quote Möller and Dollar:[1] "König has given a *résumé* of the frequency with which the cranial bones are respectively fractured, based on the official statistics of the Prussian army. Of 2,984 cases of cranial fracture, 55 affected the occipital bone, 40 the sphenoid, 33 the frontal, 10 the parietal, 4 the temporal, and 2 the ethmoid."

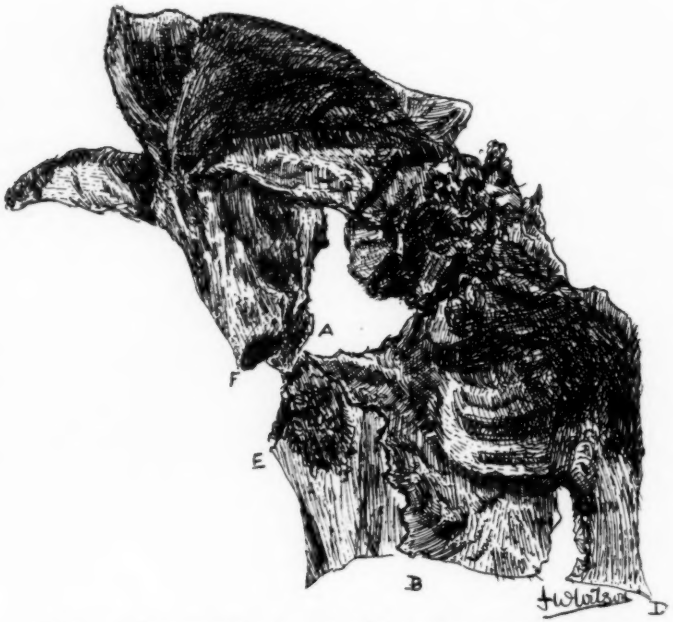


FIG. 2.—Right postero-inferior view, shewing both directions taken by the fracture.
A to B shews the line of fracture extending inferorily along the wing of the sphenoid to the margin.
D Supra-orbital process.
A E F shews the area of the transverse fracture of the sphenoid.

The petrous temporal is rarely fractured owing to its compact nature, and, by its position, protected from direct injuries in a superior and inferior direction; but on this occasion it was subjected to a force parallel to the main line of impact.

The principal line of concussion originated at the region of the os dentata, then to the base of the skull, to be immediately followed by a forcible extension of the head on the fulcrum formed by the occipital crest.

[1] "Practice of Veterinary Surgery," vol. iii., "Regional Surgery," by Möller and Dollar, 1903, pp. 123-4.

OVARO-HYSTERECTOMY AND OVARIOTOMY IN THE CAT AND BITCH.

BY PERCY J. SIMPSON, M.R.C.V.S., MAIDENHEAD.

CASE 1.—A grey cat, age uncertain, which came as a stray and took up its abode here, had one litter of kittens, and was heavily pregnant again.

After being prepared, the patient was anæsthetised with A.C.E. mixture, the abdomen cleaned, shaved, and rendered aseptic with chinosol (1 gr. to ʒi. tepid water). All the instruments were boiled and the hands thoroughly cleansed in antiseptic solution.

An incision two inches long was made in the median line, the finger inserted, and the uterus, containing four fœtuses, was drawn through the incision. Ligatures of boiled silk were applied above the ovaries, and two ligatures were applied at the os uteri. The horns of the uterus were then divided close to the ligatures above the ovaries, and the body divided between the two lower ligatures. The uterus was removed, the stump dressed with warm chinosol solution, and returned. The abdominal walls were sutured with boiled silk, and the incision in the skin treated in a similar way. A dressing of boracic acid and chinosol was dusted on, and a pad of cotton-wool placed over the wound, this being kept in position by a broad bandage. The skin sutures were removed four days later, and the wound healed by first intention. There was no loss of appetite and no symptom of straining or uneasiness shown at any period. This cat was operated upon about twelve months ago, and her expression has already greatly changed, the head resembling that of a "Tom"; she has also grown very fat. She is much less amiable in temperament than she was before the operation.

CASE 2.—Black cat, about 9 months old, heavily pregnant for first time.

Antiseptic precautions were taken as in Case 1, and the same routine was observed. In this case the ovaries and uterus containing six kittens were removed.

The cat made an uneventful recovery, and was in the house again in a week as if nothing had happened. Although operated on nine months ago, this cat allows a "Tom" in the neighbourhood to copulate with it frequently.

CASE 3.—Persian cat, 5 or 6 years old, heavy in kitten, the property of a veterinary surgeon who asked me to assist him in performing the operation.

The same measures were adopted as in the previous cases, seven kittens being removed.

I was unable to follow closely this case, but it recovered, although not making such quick progress as Nos. 1 and 2.

CASE 4.—Maiden pug bitch puppy, about 10 months old, had been sent to the veterinary surgeon to whom Case 3 belonged, and was operated on in order that she should not breed.

Antiseptic precautions, &c., as before were observed, but in this case, in deference to the wishes of my friend, carbolised catgut was

used for ligaturing, and chloroform, instead of A.C.E., was the anæsthetic.

All went well with the operation until the os was divided, when the catgut ligature slipped, and a great deal of hæmorrhage ensued. After arresting this (as we thought) the abdominal muscles and skin were sutured, when slight hæmorrhage was noticed from the vulva. This ceased in about an hour, and the case made a very good recovery, being returned to its owner a fortnight after the operation.

In this case it is to be noted that no ligature remained on the os, and yet healing took place, and there were no ill-effects noticed.

Case 5.—A cat, age uncertain, no history, heavy in kitten, sent to a veterinary surgeon to operate upon.

All that has been said about Cases 1 and 2 apply equally here, the cat roaming about as usual ten days after operation, with no trace of operation except scar, and the abdominal wall sutures could be felt through the skin.

Case 6.—A white Persian cat, about 9 months.

The owner only wished the ovaries removed. This was done as before, except that the ovary was ligatured *above* and *below*, and then excised between the ligatures, the uterus being untouched. This cat was found dead in its cage the second morning after the operation. *Post-mortem* examination revealed nothing abnormal, all the wounds being healthy and healing. Death was attributed to shock from the operation.

After the experience with Case 4, in connection with other operations, I never intend to use catgut as a suture material again, as I find it very unreliable with regard to it remaining tied and its tendency to slip. Boiled silk has never failed me, and never in my experience set up irritation in a wound.

In Cases 1 and 2, which are in my house to-day, the silk sutures in the abdominal wall have become either absorbed or covered, as they cannot now be felt. No special restrictions were placed on the cats as regards diet after the second day.

The persistent œstrum of Case 2 is particularly interesting, and confirms the experience of others on the same subject.[1] This animal will even allow and encourage copulation with the male cat, although I am quite sure that I removed each ovary and the whole of the uterus quite completely.

TREATMENT OF CATARRH OF THE EAR IN THE DOG.

Syringe the ear out well with spirit of wine to dissolve the wax, and dry carefully with cotton-wool, then use the following:—

Formaldehyde	... ...	20 centigrammes to 1 gramme.
Hydrochlorate of cocaine	...	25 „ „
Distilled water	... ...	25 grammes.

(*Bulletin des Agriculteurs de France.*)

[1] Leeney, *Veterinary Journal*, vol. xxxi., p. 11; Hobday, "Canine and Feline Surgery," pp. 132 and 135.

LIGATURE OF THE EXTERNAL DIGITAL ARTERY IN CHRONIC LAMINITIS.

BY LIEUT. E. C. RUSSELL, F.R.C.V.S., A.V.D., SHORNCLIFFE.

In August, 1903, I attended a bay cart gelding, 5 years old, suffering from a severe attack of acute laminitis in both forefeet. He was given internally laxatives, antiseptics, and febrifuges; the walls of the hoofs lowered and feet poulticed; put into a large roomy box, with careful attention to feeding, changing of poultices, and a little exercise, &c. In the course of time he was shod with bar shoes, "Broad's pattern," and put out in a small paddock to graze, stimulants being applied to the coronets daily. Recovery, however, did not take place; he hobbled about on his heels, and the hoofs gradually assumed that condition so well known in chronic laminitis (dropped sole, &c.).

He remained at grass most of the winter, mild blisters being applied to the coronets, and the feet attended to. The near foot was never so bad as the off, and he recovered considerably on this one. The off, however, gradually became worse, and eventually the owners decided to destroy him.

Having read in the VETERINARY JOURNAL of January, 1904, of a case of chronic laminitis being treated by ligature of the external digital artery, I persuaded the owners of this horse to let me try the operation, deciding to operate on the off fore only.

I cast him, and cut down on to the artery at the seat of operation for high neurectomy, put on a couple of ligatures, and then divided it between them; dressed the wound, put on a bandage, and allowed the horse to rise. On the second day after the operation there was a decided improvement in action, and the animal was allowed to run out in a paddock, the wound being dressed daily, and healed without any trouble about the tenth day.

I lost sight of my patient, but my friend, Mr. W. G. Loft, informs me that within a few weeks the horse was so much better that he was put to light work. Mr. Loft saw him on two or three occasions, the improvement being continued, and two months after the operation he was doing his regular work *on the road* and the condition of the hoof was much improved. I saw the horse again myself six months later, and he was then going well and working every day.

[NOTE.—The operation was recommended by M. J. Joly, Principal Veterinary Officer of the French Cavalry School at Samur. A paper on the subject was published by him in the *Bulletin de la Société Centrale de Medicine Veterinaire* of March 13, 1902, a translation of which will be found in in the VETERINARY JOURNAL of April 19, 1902, page 650.—EDITOR.]

NOTES UPON NEARLY FIVE HUNDRED CASES OF ABDOMINAL SURGERY IN ANIMALS.

BY FREDK. HOBDAY, F.R.C.V.S., F.R.S.E., KENSINGTON, W.

SINCE the inestimable value of a knowledge of the principles of antiseptic surgery has become appreciated amongst the members of the veterinary profession, the practical surgery of the abdomen had advanced by leaps and bounds, and has now taken its place in line with that of the surgery of other parts of the body.

In any abdominal mischief of doubtful origin, provided strict attention is paid to antiseptic precautions and the patient is safely anæsthetised, in the smaller animals, at all events, an exploratory laporotomy may be performed with impunity. This assertion is made from the carefully recorded experiences of over 480 cases, in each of which the abdomen was entered, and out of these patients 154 were horses or cattle.

In the majority of instances the use of bandages was dispensed with, the wound merely being closely sutured and hermetically sealed by a covering of iodoform colloid. This will in by far the majority of cases be found amply sufficient, and if the operation is done antiseptically, and the wound kept aseptic by being hermetically protected from contamination, it will be found that the patient (even though it be a dog, cat, or monkey) will not touch its sutures. *It is a most rare thing for an animal to interfere with its sutures if only the wound is aseptic. It is the presence of pus which gives rise to irritation.*

Although, compared with our human *confrères*, we have many disadvantages (especially in regard to the surroundings and habits of our patients) to contend with, we can, if we do but take care to adopt true antiseptic measures, ensure that fully 90 per cent. of our surgical wounds shall heal *per primam*.

For abdominal work, to ensure success, it is *absolutely* essential that scrupulous surgical cleanliness shall be observed in every detail, or, in other words, that antiseptic principles be observed. There is no royal road to antiseptic work, and there must be no half measures; it involves patience, close attention to detail and scrupulous care, but the result bears fruit which to old-fashioned operators seems quite incredible. Instead of performing an abdominal operation with fear and trembling, and with an expectancy that at the very least 50 or 60 *per cent.* of the patients will die in consequence from that former bugbear, peritonitis, the modern veterinary surgeon is astonished and vexed if any of his patients succumb to this cause.

Provided a peritonitis was not already present before the operation, the surgeon knows that if it comes afterwards it is due to some fault either on the part of himself or his patient.

Nowadays, thanks to the researches of Pasteur and Lister, it is at all events possible to avoid, in the smaller animals at least, this formerly much dreaded and very fatal sequel.

With the larger animals there are many difficulties to contend with, of which those who confine their attention to the dog and cat have no conception. Their large size and great powers of resistance render

them much more cumbersome to deal with, and for abdominal work the enormous weight and size of the intestines (especially the large portion) make any temporary weakening of the abdominal wall a matter for the gravest consideration. Besides this, the difficulties of manipulating such an enormous body as the uterus of a mare or cow, or the large intestine of either of these animals, through an incision in the abdominal wall, and at the same time preserving antiseptic cleanliness, are well nigh insuperable.

It is to be greatly feared that some operations, such as ovaro-hysterectomy of the pregnant uterus, enterotomy for calculus or other foreign body in the large colon, although perfectly possible with a successful issue in the smaller domesticated animals, will always have to be considered as impossible in the horse and cow.

Practically, however, nowadays, very many abdominal operations are justifiable in that, if done antiseptically, and before the patient is exhausted, they will restore the animal back to health and usefulness, and earn the gratitude of the owner to whom it is a source of enjoyment or value.

Operations on the abdomen may legitimately be divided into two great classes. First, those in which no actual cutting is required beyond the entrance through the abdominal wall; and secondly, those in which the knife or other instrument is brought into play upon the organs contained in the abdomen.

Attention need scarcely be drawn to the fact that in the case of the latter the risk to the patient from shock, hæmorrhage, peritonitis, and other causes, must of necessity be enormously increased; especially is this the case if the intestine is opened.

In the first class may be included such operations as puncture of the abdominal wall for ascites, simple laparotomy for exploratory and other purposes, massage of the bowel in cases of obstruction, and the removal of certain foreign bodies from one portion of the bowel to another.

The second group includes gastrotomy, rumenotomy, enterotomy and enterectomy, reduction of torsion of the bowel and of intussusception, removal of obstruction by Meckel's diverticulum and by fibrous bands, gut tie in cattle, cystotomy, oöphorectomy and ovariotomy, hysterotomy, hysterectomy and ovaro-hysterectomy.

For any of them, briefly, the main details of antiseptic preparation are as follows:—

(1) *For the Instruments.*—Sterilise by boiling for five minutes or by placing for half an hour in disinfectant solution of reliable strength.

(2) *For the Patient.*—(*a*) Shave off the hair, using hot water and antiseptic soap lather.

(*b*) Scrub the skin with ethereal soap and hot disinfectant solution, such as that of creolin or chinosol; or else scrub with ether, spirit, or some such agent which is known as a solvent for fat and is not at the same time a violent irritant.

(*c*) Scrub once more with some clean disinfectant solution.

(*d*) Swab the site of the incision dry with sterilised wadding.

(*e*) During the operation be careful not to allow the sterilised instruments, silk, &c., to touch anything which has not been disinfected. Contamination of the operator's hands and the site of incision must likewise be carefully guarded against.

XUM

(*f*) Suture close, especially after abdominal section and in wounds (such as those of the bladder and uterus) of cavities which secrete or contain fluid.

(3) *For the Operator.*—(*a*) Scrub and soak the hands and nails thoroughly with soap, nail-brush, and hot disinfectant solution.

(*b*) Scrub again with ether soap, spirit, ether, or some substance which will remove grease from the skin.

(*c*) Scrub or swill well in clean antiseptic solution.

(*d*) Do not touch anything which has not been rendered aseptic until the operation is completed.

All these are practicable; and to follow them out will give results which are no less gratifying than astounding to those who have not yet given them a fair trial. To merely swill the skin for a second or two with antiseptics and dip the hands just in and out of some solution is worse than useless. It can only lead to disaster, and is apt to bring discredit on principles which, if properly understood and followed out, will with absolute certainty preserve many thousands of lives and reflect due credit on the operator. The introduction of antiseptic principles has made surgery an exact science: it no longer gives the uncertain sequelæ which it used to do under the old-fashioned *régime*.

(*To be continued.*)

DISLOCATION OF THE NECK: DEATH.

BY M. P. LEBLANC, LYONS VETERINARY SCHOOL.

THE patient, a twenty-year-old mare, was brought to the College Hospital suffering from an injury to the neck caused by the halter, and left for treatment as an in-patient. In the evening it was noticed that she fed with difficulty. In the morning she was found down in the stall struggling violently, and was got up with difficulty. The hind limbs were stretched apart and the neck twisted to the left, the head to the right, and the nose nearly touching the ground. The neck was curved round, being convex on the right side. A dislocation was diagnosed, and an endeavour was made to bring the neck into a normal position with a strong india-rubber tube fastened to the head collar and body roller.

The patient became very restless, with inco-ordinate movements of the limbs and alternate periods of stupor, succeeded by violent agitation. Morphia injections and chloral enemata were given, but she died in the evening.

On *post-mortem* examination nothing but blood extravasation into the chief muscles of the neck could be found, the vertebræ and their articulations were absolutely free from injury, also the spinal cord.

(*Journal de Lyon*, October 31, 1904.)

A CASE OF HOOF FRACTURE.

BY LIEUT. E. PERCY ARGYLE, M.R.C.V.S., A.V.D., LONGMOOR CAMP, EAST LISS, HANTS.

On October 7 last I was called to attend a private horse, the property of an officer. The animal had been injured on the tramway which runs from here to Bordon Camp. With much difficulty it had been brought into the infirmary, where I made an examination of its injuries. The outside quarter of the off forefoot had been penetrated by some sharp instrument, probably an iron spike, or the edge of a piece of galvanized iron on the tramway, which had entered the horn near the coronet and passed inwards through the laminæ to the pedal bone. Bleeding was very profuse, but was at length stayed by cold water, bandages and styptics. It was then apparent that the horn of the quarter was split from the coronet to the plantar margin, and there was also displacement—the posterior edge of the division overlapping the anterior. The laminæ were exposed, and the wall, from the seat of injury to the heel, was lifted from its attachments.

As the horse was in great pain and almost exhausted, I gave him a stimulant and placed him in slings. The wound was cleansed, dressed with dry dressings, and a bandage applied. The next day his appetite declined, and for several days he was feverish, dull, and off his feed. The wound was dressed twice a day, and the foot was kept in a poultice-boot. There was slight suppuration at first, increasing daily, and as the overlapping pieces of horn were causing him great pain, I decided to operate. This I did on October 22.

The horse was cast and placed under chloroform. With a sharp searcher I grooved the wall from coronet to plantar margin, on either side of and about one inch away from the injury. Some force was necessary to strip off the segments of horn, and I used a blunt seton-needle, as I feared to injure the coronary band.

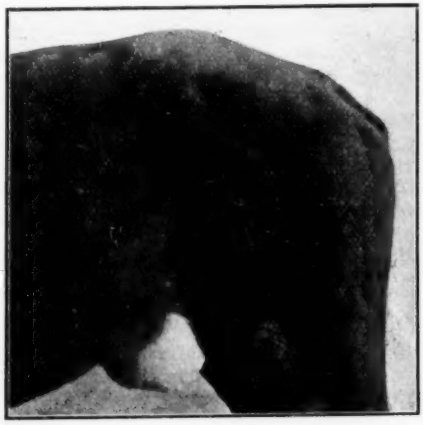
After stopping bleeding and disinfecting with a 1 in 40 solution of carbolic acid, I packed the wound with a plug of iodoform gauze, put on an absorbent bandage and the poultice-boot, and let him up. He was put into slings again, and for some days was very uneasy; there was a very slight elevation of temperature, but his appetite still failed. As he could now put the foot to the ground I let him down, but did not disturb the dressings for four days, and on removing them there was no suppuration and a generally healthy appearance of the wound. It was dressed again, and the dressings left in position for four days.

The healing process has been rapid, and already sound horn is growing above the injured spot. I have had him shod with a very light three-quarter bar shoe, and he can now walk with a fair amount of comfort.

A CASE OF VENTRAL HERNIA IN A HORSE.

BY H. E. SIMPSON, F.R.C.V.S., WINDSOR.

THE patient, a six-year-old hunter gelding, had been healthy up to the time of the injury, which was occasioned by his lashing out in the stall and getting cast by the hind leg over the stall partition. I understand that an operation was suggested at the time but not agreed to by owner: failing this, a blister was applied and a truss was suggested, but the owner became tired of treatment and gave the horse away to a friend of mine, who asked me if I would operate. This was two months after the date of the injury. Examination was difficult, owing to the horse being "touchy" from the application of irritants. I diagnosed it as a ventral hernia with extensive adhesions, and with the assistance of my cousin, Mr. P. J. Simpson, decided to attempt reduction. The horse was cast with hobbles on the off side, and chloroformed, and the near hind leg fastened right back. The sac of the hernia (composed of the outside skin) was thickened by the blister, but a distinct rupture could be felt to the left of the linea alba which appeared to be divided in the centre by a fibrous band. After



Photograph showing the situation of the hernia under the left flank.

shaving and antisepticising the parts, an incision was made at the superior part of the sac and explored with the finger. After the discharge of a serous fluid, the bowel could be distinctly felt to be firmly adherent, not only to the sac, but to the walls of the hernia itself.

The opening was enlarged and the process of breaking down the adhesions commenced, which was accomplished with the finger and the use of the scalpel and ligature for the vessels, which were very numerous. This process occupied no less than one hour and twenty minutes. We then ascertained that the rupture was an extensive one,

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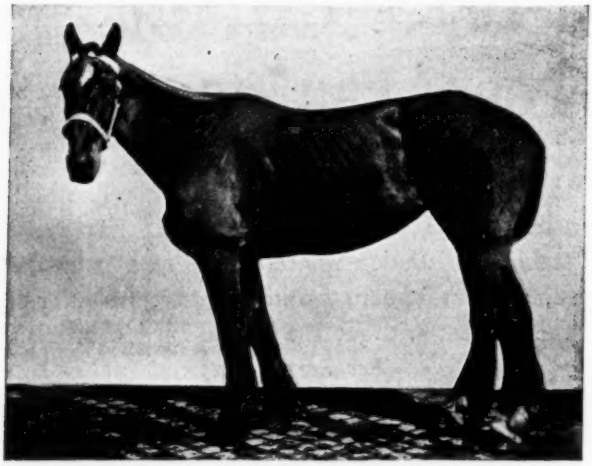

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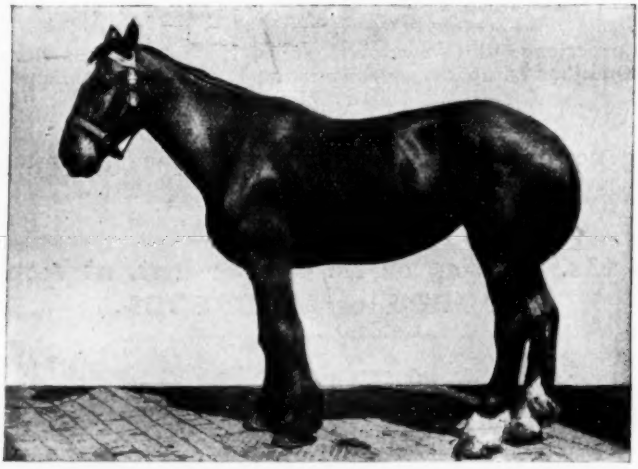

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The main feature of this case was the excessive granulation present, not only around the ruptured abdominal wall, but around the sac and the bowel itself, no doubt attributable to a great extent to the application of irritants.

TUBERCULOSIS OF THE MESENTERIC GLANDS WITHOUT ANY INTESTINAL LESION, IN A FOUR-MONTHS-OLD PUPPY.

BY PROFESSOR G. PETIT, ALFORT.

TUBERCULOUS glands are often seen in the dog without any corresponding lesions in the viscera. Often the tracheal and mesenteric lymphatics get to an enormous size, even cavernous, without any trace of tuberculosis in either the lungs or intestine. The case in question is interesting on account of the age of the subject, which had always lived in the country and had without doubt become infected through eating either human tuberculous sputum or tuberculous offal from slaughter-houses. The mesenteric glands in this case were greatly enlarged and very rich in the bacilli, whereas the intestine, although most carefully examined, showed no trace of any such lesion.

(*Recueil de Médicine Vétérinaire*, December 15, 1904.)

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BILIARY FEVER OF HORSES IN INDIA.

BY LIEUT. S. F. G. PALLIN, M.R.C.V.S., A.V.D., MUTTRA, INDIA.

A FORM of fever, associated with bilious symptoms, has been known to exist among horses in India for many years. It occurs chiefly in the plains of Bengal, the Punjab, and other low-lying and feverish districts. Cases are most frequent in the summer months and early autumn.

Biliary fever in India is generally believed to be connected with certain unfavourable dietetic or climatic conditions, such as a diet too rich in albuminates during the hot months of the year; rapid changes in the external temperature, such as occur when the east winds come in the hot weather, are said to cause chills, and so favour an attack of the disease.

The death-rate of horses in India from this cause is low, the disease runs a benign course, and the tendency is toward recovery. Imported animals suffer most, more especially newly imported English and Australian horses; Arabs are less frequently affected, and country-bred horses apparently enjoy a certain degree of immunity.

SYMPTOMS.

Taking an average case for example, the following is the line of symptoms generally noticed:—

The animal may first attract attention by showing any of the usual signs of fever, such as dulness, rigors, or loss of appetite; but very often an attack of colic is first noticed, which quickly passes off under treatment.

On further examination an increase of temperature is found, and the conjunctival mucous membrane is of a brick-red colour, or perhaps yellowish. In such a case it is probable that the horse has not been well for two or three days, but that owing to no diminution of appetite and ability to perform ordinary work, nothing amiss has been noticed.

The pulse is soft and frequent, 60 or over. There is constipation; the fæces are of a dark red or reddish-yellow colour, and show traces of mucus. The urine on examination is found to be altered in appearance, it may be dark yellow, or in some cases of a pinkish tint, and on chemical examination an excess of albumen is found. Hæmoglobinuria as a symptom is not common—I have not observed it in any of my cases.

The conjunctival mucous membrane shows, in all instances, a marked constancy in appearance at different stages of the attack; at first, if the horse be in good condition, the colour is brick-red; after this it becomes more yellow and paler as the anæmia increases; then, as the fever passes off, the normal pink colour returns.

The temperature reaches its height, usually about 105° F., on the second or third day, after which it falls a degree or two, and so remains for three or four days; then it rises again, showing that the fever is of an intermittent type; at this period, too, a marked difference between morning and evening temperatures will be noticed. The pulse becomes more frequent, often 70 or 80, weaker, thready, and

perhaps intermittent. In many cases there is great depression and loss of appetite, the breath has a bad odour, anæmia is a constant symptom, and the jaundiced condition of the membranes is best seen at the side of the mouth, where the mucous membrane passes from the lower jaw to the lip, just below the interdental space.

After a period of intermittent fever recovery is the rule, unless complicated by some chronic disease; in some cases distinct relapses occur.

Complications must be particularly guarded against in animals which are either very gross or poor in condition at the commencement of an attack. Horses of gross temperament which maintain an appetite, if allowed a heavy diet, have frequent attacks of colic, which may end fatally; they eat more than the digestive apparatus, in its weakened condition, is able to deal with. In thin animals, on the other hand, the disease runs a more severe course, and then debility renders them susceptible to such complications as pneumonia and enteritis.

POST-MORTEM APPEARANCES.

Before opening the carcase emaciation and the yellowish colour of the mucous membranes will be noticed, the conjunctiva often showing large purple hæmorrhages. On removal of the viscera the blood is found to be altered in appearance, and clots slowly. A variable quantity of yellow or slightly blood-stained fluid is found in the serous cavities; the lungs are œdematous in many cases; the liver is engorged, and of a reddish-yellow colour; the spleen is enlarged and softened, and shows small subcapsular hæmorrhages. The mucous membrane of the small intestine is frequently bile-stained and in parts shows ecchymoses; no obstruction to the flow of bile can be found.

TREATMENT.

There are many methods of treatment, though in many cases little is required beyond nursing, care in diet, and good hygienic surroundings. Quinine is considered a specific by many, while some recommend a mild purgative combined with calomel, followed by tonics, &c. In my hands the treatment advised by Hutcheon for biliary fever in South Africa, combined with three or four ounces of magnesium sulphate in the drinking water, has met with considerable success.

Hutcheon (*Veterinary Record*, xiv., p. 717) recommends giving, every eight hours, a ball containing half an ounce of ammonium chloride and half a dram of extract of belladonna. This is the form of treatment which I invariably prescribe. After having seen cases of biliary fever in India I was struck by the similarity of the disease to the equine malaria or biliary fever of South Africa. While serving in that country I had the opportunity of seeing a great many cases, more especially at Pietersburg, Transvaal, to which station numbers of horses returned from the "low country" suffering acutely from malarial fever.

Though differences do exist in the symptoms and *post-mortem* appearances, it seems to me that this is due to the fact that the disease in India tends to run a milder course; as instances may be noted the microscopic changes in the blood and urine. In South African biliary

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fever the blood is often of a brownish colour and will not stain the hand red, while hæmoglobinuria I noticed as a symptom on several occasions. This rather indicates that the difference between biliary fever of India and South Africa is merely one of intensity of the attack. Similarly it may be noticed that redwater and rinderpest among cattle exist in India in a comparatively mild form, hæmoglobinuria not being a common symptom of the former disease.

The recent researches in connection with biliary fever of horses in South Africa by Theiler (*Journal of Comp. Path.*, xvi., p. 2) led to his discovery of a parasite—a "piroplasma"—in the blood of affected animals. Theiler terms the disease "equine malaria," and the parasite *Piroplasma equi*.

Not only in the horse but in other species also symptoms such as are shown in biliary fever have been found to be due to the presence of a hæmatozoon in the blood.

Among cattle the disease known as "Texas fever," "bovine malaria," "redwater," &c., is caused by a protozoon, the *Piroplasma bigeminum*. This disease has been noted in almost every country, and has been described by many observers, all of whom agree in ascribing the cause to a similar parasite. Rhodesian redwater, first reported upon by Gray and Robertson (*Veterinary Journal*, vii., 39), is also due to a hæmatozoon, differing somewhat from the piroplasma of Texas fever.

Dale (*Journal of Comp. Path.*, xvi., 4) has recorded an affection among donkeys in South Africa, characterised by anæmia and symptoms somewhat similar to those of equine malaria, and which has been demonstrated to be due to a piroplasma. This, according to Theiler, is probably caused by the same organism as affects horses and mules in that country.

Among dogs a disease termed "malignant jaundice" by Lounsbury (*Journal of Comp. Path.*, xvii., 2), in South Africa, has been shown to be due to a parasite affecting the red blood cells, and which has been termed the "*Piroplasma canis*." In France, also, piroplasmosis of the dog has been reported by Nocard (*Veterinary Journal*, vol. lv.)

Laveran and Nicolle (*Société de Biologie*, No. 27, 1899) have described an outbreak of disease among sheep near Constantinople due to the presence of a piroplasma in the red blood corpuscles. The train of symptoms described in connection with these diseases in the literature referred to bears a striking resemblance to the symptoms shown in biliary fever of the horse in India. The possibility, therefore, presents itself, that the disease under consideration may also be caused by a similar hæmatozoon, which would account for the changes in the blood and intermittency of the fever, both marked symptoms in the disease, and for the biliary symptoms, which apparently are not due to direct congestion of the liver.

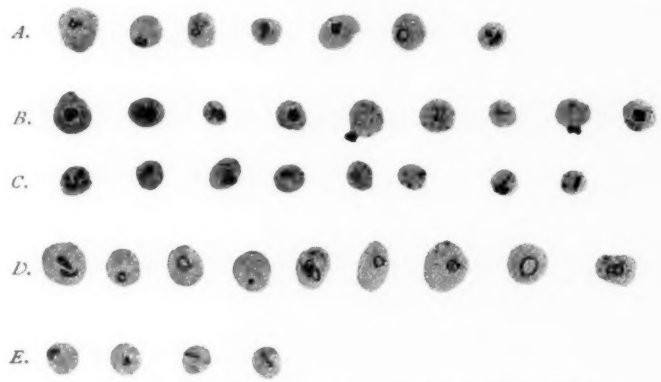
With this object in view I examined the blood of a number of horses suffering from typical biliary fever at different stages of the disease, and in all of these cases I found that some of the red corpuscles contained an organism of the nature of a piroplasma. The micro-organism is not necessarily present, or rather cannot be found, during the whole course of an attack, being more numerous on some days than others. In no case were they very numerous, never more than three or four blood corpuscles being affected in a field.

STAINING OF THE ORGANISM.

The piroplasma can with difficulty be detected in unstained preparations of the patient's blood. With methylene blue the organism takes on a deep blue shade, which shows well in contrast with the pale green colour of the erythrocytes.

Theiler (*Journal of Comp. Path.*, xvi., 2) recommends the method adopted by Laveran. I have obtained good results with the Romanowsky method and Nocht's modification; the former gives somewhat clearer definition. With all three methods the protoplasm of the organism stains blue and the chromatin a bright red colour.

PLATE ILLUSTRATING THE PIROPLASMA IN THE RED BLOOD CORPUSCLES OF FIVE CASES OF BILIARY FEVER.



Drawn with Zeiss apochromatic oil immersion; 2 mm. + Huygenian eye-piece No. 4.

A. Case No. 1. Piroplasma found during first seven days of the disease.

B. Case No. 2. The first five figures were taken from a blood smear on the seventh day. Temperature 104·2° F. The latter four figures on the twelfth and thirteenth days.

C. Different forms of the Piroplasma found in Case No. 3. A relapse occurred n this case.

D. Different forms of the Piroplasma found in Case No. 4; some of these show very distinctly the ring-shaped form. A relapse also occurred in this case.

E. Taken from Case No. 5 on the tenth and eleventh days, showing ovoid and baton-shaped forms.

MORPHOLOGY.

In comparison with the *Pirosoma bigeminum*, this parasite is of a much smaller size; it frequently occurs in pairs, but is also found singly; at times, one corpuscle may contain as many as six parasites. The most common form is in the shape of a flask, with the chromatin dot at the neck. Many other forms are also found, some bearing a slight resemblance to the pear-shaped bodies of Texas fever; others in the form of rings, with rims deeply stained blue, and unstained centre, showing one or more chromatin dots in the margin. Forms in

the shape of a baton also occur, with the chromatin dot in the finer end. Many very small round bodies, resembling cocci, are found in the red cells; they stain uniformly blue, and show no chromatin. Many of the ring-shaped forms show a striking resemblance to the æstivo-autumnal micro-organism of human malaria.

I have examined the blood of many horses in apparent health, and in no instance have I been able to find the parasite which I have observed in the case of biliary fever. In a few cases of simple fever I have found the piroplasma in very small numbers, and principally in the form resembling micrococci.

In addition to the presence of the piroplasma in biliary fever, the blood shows other abnormalities. Sometimes a drop obtained for examination will appear striated, owing to separation of the cells and plasma. Examined microscopically, the following conditions are found to exist; they are most marked early in the disease, the blood gradually returning to a normal appearance when the crisis is over:—

(1) Numerous poikilocytes and crenated cells.

(2) Large numbers of macrocytes, many being as large again as the normal red cells.

(3) Microcytes and nucleated red cells are seen in severe cases.

(4) There is often no decrease in the number of red corpuscles, but they stain faintly, and show a loss of hæmoglobin.

(5) There is frequently an increase in the number of mononuclear leucocytes.

DERMOID PTERYGION IN THE DOG.

Pterigion, or partial cellulo-vascular or fibro-plastic hypertrophy of the conjunctiva, which in the domestic animals is usually covered with hair similar to the rest of the coat is extremely rare. It has only been recorded in the horse and dog, and is congenital.

M. Collard, of Vitry le Francois, and M. Thierry, of Sermaises, report a case in a three-months-old greyhound pup. In both eyes there was a small tumour of a triangular shape, with the apex directed towards the centre of the eye, situated at the external angle. They were covered with hairs and interfered with vision.

It was decided to operate as the only remedy. The tumour was seized at the centre with a pair of fine forceps, and incised round the base with a very sharp scapel, and then dissected off. The patient was shut up with his mother in a dark room, and the eyes bathed twice a day with clean water. During the first three days there was slight suppuration, and the mother kept them clean by licking them. In a month the wounds had cicatrised, leaving only a very small white scar, which eventually disappeared.

In a case of pterigion described by M. Saint Yves, Menard, the hairs grew from a small tumour on the caruncula lacrymalis.

Le Bulletin Veterinaire, December 15, 1904.

A CASE OF LOCAL REACTION TO TUBERCULIN IN THE HORSE.

BY F. H. RIDLER, M.R.C.V.S., AND F. HOBDAY, F.R.C.V.S., KENSINGTON, W.

THE case recorded herewith is of exceptional interest on account of the enormous local reaction which on two separate occasions, some months apart, followed the application of the tuberculin test.

The patient, a Shire gelding, 8 years old, had been in the possession of the present owners about two years, and had apparently enjoyed good health until June, 1904. The driver then noticed that occasionally the animal worked slowly and without apparent energy. At this time nothing very much could be noticed. The teeth were attended to and some tonic medicine prescribed, and the horse, after a few days' rest, returned to work. In a short time, however, this lassitude had increased so markedly, and the animal appeared so weak, that the patient was admitted to hospital and put through a prolonged course of highly nutritious diet and tonic medicine. The mallein test was applied, but gave no result, and, in September, a dose of tuberculin was injected subcutaneously in the neck.

The temperature reaction was as follows: For several days before injection the average, night and morning, was 102°. At time of injection, 8.30 p.m., 102°; 5.30 a.m., 104°; 8.30 a.m., 103·6°; 10.30 a.m., 103·6°; 2 p.m., 103·4°; 5 p.m., 103·4°; 8.30 p.m., 103·3°. On the following day there was a large local reaction, about five inches by four, which persisted for three days.

Thinking that perhaps there had been some contamination of the syringe (although every antiseptic precaution had been taken), the horse was left until November, when a larger dose of tuberculin was injected. During this period there had been a perceptible continuance of the emaciation.

The temperature reaction was as follows: At time of injection, 12.30 p.m., 102·5°; 9.30 p.m., 104°; 12.30 a.m., 104·2°; 3 30 a.m., 103°; 6.30 a.m., 102·5°; and there was again a local reaction, this being even larger than the previous one.

Arrangements were now made to send the horse to the College, in order that the students might see the *post-mortem* examination, but, unfortunately, the animal died suddenly, about 3 a.m., on December 1.

Post-mortem examination revealed the lungs to be studded with myriads of miliary tubercles; the heart was enormously enlarged and weighed 13½ pounds; the pericardium was covered with tubercles; the lymphatic glands of the chest, mesentery and intestine were enlarged (some of them as big as an orange), and the spleen was full of tubercular masses. The liver and kidneys were not affected.

Specimens were sent to Professor McFadyean, who reported: "I find tubercle bacilli numerously present in some of the lesions. As usual, the disease appears to have started in the abdominal cavity. The lungs are filled with tubercles about the size of a pin's head."

XUM

THE PURVIS ORATION ON ABDOMINAL PREGNANCY IN WOMEN, CATS, DOGS, AND RABBITS.[1]

Delivered before the West Kent Medico-Chirurgical Society on December 2, 1904.

BY JOHN BLAND-SUTTON, F.R.C.S.ENG.
SURGEON TO THE CHELSEA HOSPITAL FOR WOMEN, ETC.

MR. PRESIDENT AND GENTLEMEN,—In spite of the great increase in our knowledge of the later stages of extra-uterine gestation, and more especially in those conditions where the fœtus survives to or near term, there is still in the minds of some writers a lingering belief in the existence of a primary abdominal pregnancy: by this I mean that an oösperm (fertilised ovum) may escape from the Fallopian tube and engraft itself on the omentum, intestines, or other abdominal organ, and develop into a fœtus. The accurate work of Dr. D. Berry Hart and Professor J. W. Taylor has shown how many of these extra-uterine fœtuses find their way through the walls of the Fallopian tubes into the abdomen, but there are a few puzzling cases still requiring elucidation which will receive consideration in this lecture.

Among these anomalous varieties of gestation it is my intention to draw particular attention to a case of very great importance, interest, and rarity described by Leopold in 1896. The chief facts are these: A woman advanced in pregnancy to the fourth month fell downstairs and injured herself in the abdomen. At the time she should be delivered an examination led to the diagnosis of an extra-uterine gestation. Cœliotomy was proposed and carried out. A fœtus of about the fourth mouth of gestation enveloped in a thin (amniotic) sac occupied the abdomen, and its umbilical cord passed through an opening in the posterior wall of the uterus. Subsequently the uterus, which also contained the placenta, was removed with success. The obvious interpretation to place on these facts is this. The uterus sustained injury when the woman fell downstairs, and the fœtus in its amnion was slowly extruded into the abdomen through a rent in the posterior uterine wall. The full history of the case, with illustration, will be found in the *Archiv für Geburtshülfe und Gynakölogie*, 1896, Band lii., S. 376. This condition of things has conveniently been described as utero-abdominal pregnancy.

The chief interest of Leopold's valuable case lies in the fact that although utero-abdominal pregnancy is extremely rare in women, it is the common form of extra-uterine pregnancy in mammals with long two-horned uteri. In 1889, when engaged in collecting the material for my book on "Diseases of the Ovary and Fallopian Tube," I made a careful study of the records and available specimens of extra-uterine gestation in what are called the lower animals, and quickly satisfied myself that tubal pregnancy in them is very rare; indeed, I have failed to find a single convincing record or specimen, but there are very many cases recorded in which puppies and kittens enclosed in tightly-fitting sacs have been found adherent to the omentum and intestines. Some of these cases of extra-uterine kittens and puppies have been regarded even by experienced pathologists as examples of

[1] For permission to reproduce this article we are indebted to Mr. Bland-Sutton and to the editors of the *Lancet*.

primary abdominal pregnancy. In 1891 I advanced the following explanation of this phenomenon based on the actual dissection of many examples of rupture of the uterus in the early and later stages. In mammals with two-horned uteri the horns are of some length and often contain several fœtuses. When the fœtuses are too large to traverse the maternal passages the uterus, as a consequence of its violent efforts to expel its contents, ruptures, and the fœtus or fœtuses are extruded into the abdomen. This accident in many instances entails the death of the mother, and on examination in these circumstances there is rarely any difficulty in determining the course of events. In some cases the animal survives the accident, and after the fœtus or fœtuses have escaped through the rent the contraction of the uterus rapidly follows, and the edges of the opening unite and quickly cicatrise. The imprisoned fœtus adheres to the omentum, the amniotic fluid is absorbed, the placenta disappears, and the amnion shrinks and compresses the fœtus as tightly as if it had been

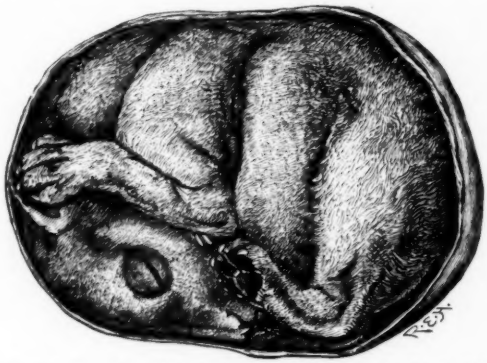


FIG. 1.—A puppy in its amnion which with two others had been retained in the abdomen of a retriever bitch subsequently to rupture of the uterus. (Natural size.)

swathed in mummy-cloth (fig. 1). In time the amniotic sac becomes covered with fibrinous exudation furnished by the peritoneum, which slowly organises and leads to a considerable increase in the thickness of the sac. In some instances the fœtal sacs do not adhere to any viscus, but remain free in the abdomen.

A prolonged study of this question has served to convince me that the majority of the cases of extra-uterine fœtuses met with in cats, bitches, ewes, and rabbits are not in any sense primary abdominal pregnancies; they belong to the same category as Leopold's case to which I drew your attention, they are, in fact, utero-abdominal pregnancies. This view of the origin of so-called abdominal pregnancy in mammals has recently received independent support by two observers, Pembrey and Kamann, from observations made by them on rabbits. In 1898 Dr. M. S. Pembrey exhibited to the Obstetrical Society of London five fœtal sacs which he found free in the peritoneal cavity of a rabbit. The animal (bought for breeding) was pregnant in October, 1897, and between that time and June, 1898, produced four normal

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litters. It was noticed that the abdomen appeared to be somewhat distended after the casting of a litter. On that account and because this doe neglected or devoured its young it was killed within a week of the last littering. When the abdomen was opened five white discoidal bodies were found. None of the bodies showed any attachment to the abdominal organs or to the peritoneum ; in all but the smallest sac the head, body and limbs of a fœtus could be felt (fig. 2). Dr. Pembrey then gives a careful and detailed account of the condition of the uterus and its horns ; he found a scar on the front of the uterus just below the junction of the cornua. His conclusions are important, for he considers that the rupture occurred at least eight months before the examination of the doe, for in that interval it had four normal litters. From the size and development of the fœtuses in the sacs there is little doubt but they reached full term when the rupture took place. Sufficient explana-

FIG. 2.—A fœtal rabbit with its placenta inclosed in its amnion ; found loose with others in the abdomen of a doe rabbit. (Museum of the Royal College of Surgeons of England.)

tion for the causation of the rupture is found in the fact that four fœtuses were inclosed in one sac, and he believes that it was the impaction of their bodies which caused obstruction to delivery and consequent rupture. The full description of the specimen is furnished by Dr. Pembrey and Mr. G. Bellingham Smith in the *Transaticons of the Obstetrical Society of London*, vol. xlvi., p. 283, 1904, and the specimens are preserved in the Museum of the Royal College of Surgeons of England.

Kamann has published an equally convincing case which also occurred in a rabbit.[1] This paper contains some very carefully done drawings illustrating the minute structure of the uterine wall in the situation of the scar. One of the fœtal sacs having become adherent to the omentum had dragged its stalk and undergone axial rotation, wsting its pedicle eight turns. Kamann, from a very careful investigation of his specimen, comes to the conclusion that it was a case

[1] *Monatsschrift für Geburtshülfe und Gynakologie*, 1903, Band xvii., p. 588, Berlin.

of primary rupture of the uterus and that the embryos in their membranes were discharged into the abdomen and acquired an attachment to the omentum.

It is necessary to point out that when a fœtus in its membranes is discharged from the uterus into the general peritoneal cavity the amnion is a thin transparent glistening membrane, but the envelopes of these transplanted fœtuses are opaque, thick and often tough. It has long been known that when foreign bodies gain entrance into the general peritoneal cavity they soon become covered with a fibrinous exudation formerly known as lymph, which quickly organises and not only forms an investment to the bodies, but in many cases serves as a material which practically glues them to whatever viscus they may be in contact with. In the cases of the fœtal membranes it transforms them into a thick, tough and opaque material.

It is curious to contrast the rabbit with the hare in relation to this accident. The rabbit has many young in a litter, twelve, fourteen, or more. The hare has two or three at a birth and, unlike the rabbit, its young can see as soon as they are born. The hare is also liable to rupture of the uterus and the escape of the fœtuses into the abdomen, but its liability to this accident is less than that of rabbit, cat, or bitch; but a number of cases have been carefully recorded in which a gravid uterine cornu in the hare has undergone axial rotation, and in some instances the twisting of the cornu has led to its complete detachment. Cases of this kind have been recorded by Hutchinson, Dohrn, Klebs, and others. The references to the literature of these cases will be found in my book on the "Surgical Diseases of the Ovaries and Fallopian Tubes," second edition, 1896. Kamann has recently collected the German literature in an article in the *Monatsschrift für Geburtshülfe und Gynakologie*, 1903, Band xvii., p. 588.

Gravid Fallopian tubes occasionally undergo axial rotation in women, and carefully observed examples have been reported by Pozzi, Martin, and others. There are also reasons for believing that the same accident has occurred in connection with cornual pregnancy. I am drawing your attention to these curious conditions in cats, rabbits, and other animals with the hope of proving to you that a similar process occurs in women, but with this difference, it is quite an exceptional thing for a fœtus to be extruded through a rent in the uterus into the pelvis or the abdomen, and the patient to survive. As a matter of fact, Leopold's case, which has already been briefly quoted, is the only example that I know of in gynæcological literature. When pregnancy happens in the Fallopian tube the anatomical conditions of pregnancy in the long uterine cornua of the cat or rabbit are more nearly fulfilled; but be careful not to misread my meaning, for the Fallopian tubes of women and the long uterine cornua of the rabbit and cat are not homologous; the Fallopian tubes (oviducts) of these creatures will be found coiled up at the anterior extremity of each cornu. It has been abundantly demonstrated in the past fifteen years that it is a very common event, especially in women who dwell in towns, for one or even both Fallopian tubes to become gravid, and I will give you some facts to prove that in some rare instances tubal fœtuses may be extruded into the general peritoneal cavity and be found in conditions similar to those of Dr. Pembrey's rabbits.

For nearly twenty years I have taken the deepest interest in the condition known as extra-uterine gestation, and the gradual un-

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ravelling of the facts from the fancies with which they were entwined until some twenty-five years ago can be described as most engrossing. One of the most difficult questions to determine, and especially to silence what may be called the conscientious objector, was the mode in which fœtuses found their way from the tube into the abdomen. Professor J. W. Taylor has shown in a very careful piece of work how those tubal fœtuses which go to full term slowly expand and erode the tubal wall as they grow, until the amniotic sac emerges into the general peritoneal cavity. His explanation is accepted by those who have had opportunities of operating on examples of this form of tubal pregnancy, but in all the cases considered by him, and in those published by others to support his opinions, the fœtal sac has remained in relation with the Fallopian tube in which it originated. I will ask you to listen to the following story. In 1891 Dr. Mendes de Leon and Dr. Catherine van Tussenbroek, of Amsterdam, communicated to the

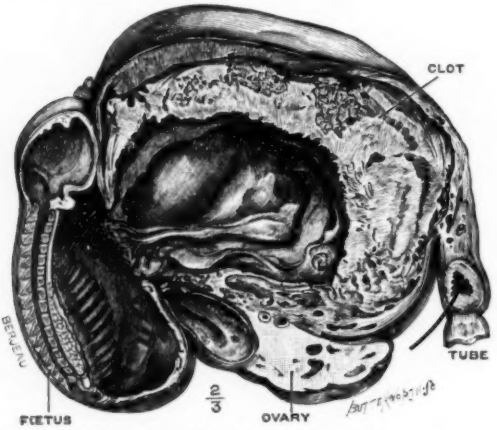

FIG. 3.—A gravid Fallopian tube in which the fœtus has been slowly extruded from the tube. Dr. Cullingworth's case. (Museum of St. Thomas's Hospital.)

British Gynæcological Society a paper dealing with a case of ectopic pregnancy. The patient was a pale, fragile-looking woman, the mother of six children. Knowing that she was again pregnant and having passed the time when she ought to be delivered, she was much disturbed that the confinement had not happened. The patient furnished a very clear history, and such an obvious and very movable lump existed in the abdomen that a diagnosis of abdominal pregnancy was made, and an operation was decided upon. Upon opening the abdomen a fœtus appeared lying loose in the abdomen, save for some adhesions to the great omentum. The fœtus, which had advanced to about the sixth month of gestation, was tightly girt about with its amnion. A round swelling occupied the left half of the pelvis and pushed the uterus to the right. This was removed, and a subsequent examination disclosed it to consist of the left Fallopian tube and the shrunken placenta. The authors of the paper entered very carefully into the consideration of the mode by which this fœtus reached the general peritoneal cavity without entailing the death of the mother, and

suggested the possibility that the fœtus might have been expelled through the ostium of the tube or have escaped through a breach in its walls. Certainly this case is very exceptional among the records of extra-uterine gestation in the fact that the fœtus was free from its pelvic attachments.

The Museum of St. Thomas's Hospital contains a specimen which, in some of its features, is as remarkable as the foregoing. In 1892 Dr. C. J. Cullingworth exhibited at the Obstetrical Society of London a gravid Fallopian tube which he had removed from a bright, healthy, active woman, 32 years of age. When the specimen was shown to the Society it appeared so exceptional that it seemed expedient to submit it to a committee for special report; I happened to be a member of that committee of investigation. It will be seen, on referring to fig. 3, that the specimen consisted of a gravid tube, and that the gestation sac appears constricted into two compartments, of which one contains the placenta infiltrated with blood-clot, and that the smaller cavity is occupied by a fœtus which is compressed against its periphery by blood-clot. The report concludes with this significant sentence: "There is no proof that the tube has undergone rupture."

This specimen has puzzled me from the time I first saw it, but it is interesting to us to-night, for it helps us to understand the case of Mendes de Leon, because we have in it a fœtus arrested and killed in the act of extrusion from the tube. It may be through a rupture in the walls of the gestation sac, or it may be, as some of us thought at the time when the report was formulated, a fœtus in its amnion in the process of extrusion through the cœlomic ostium of the tube. Oddly enough, whilst engaged in the preparation of this lecture, a short note[1] was published, stating that Pestalozza, in operating on a woman for secondary abdominal pregnancy, found the fœtus in the recto-vaginal pouch; the placenta occupied the ampulla of the tube, and the umbilical cord passed through the cœlomic ostium of the tube. This is a very important observation, and it helps us to believe, with the evidence afforded by the observations of Cullingworth and Mendes de Leon, that a fœtus may be extruded into the abdomen through an unclosed cœlomic ostium.

That a fœtus may be extruded through an unclosed ostium is also proved by a case in Cullingworth's practice, recorded by Fairbairn, in which a fœtus was found in process of extrusion through the cœlomic ostium of a tube; the lower legs, trunk, and arms were hanging out, but the head was too big to be ejected. I submit that these observations are of very great value, for the evidence previously available appeared to indicate that the discharge of a tubal mole into the pelvic cavity through an unclosed cœlomic ostium could only occur when it did not exceed the dimensions of a shelled walnut, but now we have to realise the probability that a fœtus advanced to the twelfth week of pregnancy may be slowly extruded through an unclosed ostium, an event as remarkable as it is unexpected.

The great object, however, which I had in view in collating the facts which form the basis of this lecture is to point out the valuable support they afford to the contention I have maintained for many years, that primary abdominal pregnancy still remains an unverified speculation.

[1] Epitome, *Brit. Med. Journ.*, September 24, 1904.

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SPECIMENS OF CARCINOMA IN THE THROAT OF THE DOG AND THE CAT.

At the meeting of the Laryngological Society, held at 20, Hanover Square, W., on November 4 last, Professor Hobday, F.R.C.V.S., introduced by Mr. de Santi, demonstrated specimens from five cases of true epithelioma of the throat of the dog and the cat, all of which had been confirmed by microscopical examination either by Professor McFadyean, of the Royal Veterinary College, or by Dr. Bashford and Dr. Murray, of the Imperial Cancer Research Fund. All five cases had been under the care of Professor Hobday, and had been met with since January, and, in fact, four of them since June in this year. He particularly drew attention to this fact, because it used to be thought, even until recently, by some pathologists, that carcinoma in the lower animals was exceedingly rare. He did not think that it was as common as other tumours, but now that the disease was particularly looked for, numbers of well-authenticated cases had been found in the horse, the cow, the sheep, the dog, the cat, and even the pig. Professor Hobday pointed out that one must not forget that cancer is a disease most frequently met with in old age, and that in the varieties of animals used for food, opportunities for the growth of such tumours are comparatively rare, because the host is killed before reaching even adult age.

Case 1 occurred in January, 1904, in a foxhound bitch, between 7 and 8 years old. The tumour was situated on the left side of the throat. The symptoms were those of lassitude and emaciation. The growth at first was supposed to be an abscess. She was sent to London for operation, and at the request of Professor Hobday discretionary power was given to painlessly put an end to her before recovering from chloroform if the growth were found to be a cancer and inoperable.

Case 2 occurred in June, 1904, in a poodle, aged 7, the right side being affected. Examination of the mouth revealed an ulcerated jagged sore on the right side of the fauces, just in front of the tonsil. The cervical glands were much enlarged, the patient had difficulty in swallowing, salivated freely, and was becoming emaciated. The growth had been observed about four months, but latterly had become much enlarged.

Case 3 occurred in August, and was also a poodle which had been treated for some four months for an ulcer of the mouth. Dysphagia had been noticed for some months, and the enlargement of the cervical glands had latterly much increased. Salivation was profuse, the appetite capricious on account of the soreness of the mouth, and the patient was perceptibly becoming emaciated.

Case 4, seen in September, was a Pembrokeshire terrier, 8 years old, of which a sketch and also the larynx was shown. There was a jagged ulcerating wound on the fauces, and the cervical glands were enlarged. The owner had observed the patient to be "out of sorts" for about five months, but during the last six weeks had noticed considerable dysphagia, great lassitude, salivation, and general emaciation.

Case 5, met with last month, was of particular clinical interest on account of the situation of the growth. It was an epithelioma of the

œsophagus of a cat. The animal was 8 years of age, and was brought for advice on account of a continual gulping movement when swallowing, a capricious appetite, and inability to take solid food. An obstruction in the throat was suspected, and when the probang was passed it could be distinctly felt to go over some foreign body, and then to go on satisfactorily into the stomach. As a repetition of the process always gave the same result, and the obstruction could also be felt when the instrument was withdrawn, a growth of some kind was diagnosed, and, as the owner did not (for sentimental reasons) wish for any cutting operation, the patient was chloroformed to death.

All the specimens were proved to be of the squamous-celled variety of epithelioma; in each dog the larynx, floor of the mouth, and palate were affected, there being secondary infection of the cervical glands. In none of the cases had the infection spread to the lungs or digestive tract.

Professor Hobday remarked that there was a popular impression to the effect that true carcinoma was not common in the animal kingdom, though veterinary surgeons had for many years known of its occurrence, as also had those who did work in comparative anatomy. Since so much attention had been drawn to the subject by the Imperial Cancer Research Fund it was found to be comparatively common in animals. Still, he frequently saw it stated in the medical papers that carcinoma was not common in animals. If such an assertion was in the minds of those who had facilities for expert work on the subject, certain analogies were drawn which were incorrect. It was said that in the human subject the irritation produced by a pipe and such things was a common percursor of cancer; animals did not smoke, but irritants got across the mouth which produced abrasions in the mucous membrane. In each of the laryngeal cases exhibited the primary wound was apparently just where a bone would get fixed across the back of the throat. That frequently happened in the dog, and it was possible that some irritant there might have caused the sore from which the carcinoma started. The horse and the cow had long been known to suffer from cancer, especially in certain situations, and he had other specimens. The five exhibited were shown because, being in the region of the throat, he thought they would possess special interest for members of the Society.

The President said the thanks of the Society were due to Professor Hobday and Mr. de Santi for bringing forward such interesting matter. He did not know that carcinoma was supposed to be so rare in dogs, of which he had kept a fair number during his life, and among these he had only two affected with cancer. The first case was one of carcinoma in the mamma of a bitch, which he had had removed by a veterinary surgeon, as he suggested malignancy. But the veterinary surgeon, in spite of Professor Hobday's statement, replied that cancer did not occur in dogs. However, he (Dr. McBride) had it examined microscopically, when it was found to be typical carcinoma. The next was in a favourite dog of his. He did not have it microscopically examined, but it was undoubtedly typical epithelioma of the lip. He removed it himself. Three months later an enlarged gland was observed, and he had to have the dog destroyed because it could not swallow.

(*Proceedings of the Laryngological Society*, November 4, 1904).

XUM

HORSES OF DIFFERENT COUNTRIES, AND SUPPLY WITH RELATION TO MILITARY SERVICES.

LECTURE BY MAJOR J. MOORE, ARMY VETERINARY DEPARTMENT.

Given at the Royal United Service Institute, Wednesday, December 7, 1904, at 3 p.m.
Major-General H. C. O. PLUMER, C.B., Quartermaster-General, in the Chair.

(*Abridged Report.*)

THE experience of the Boer War has shown the imperative necessity, for all time, of a maintenance of a proper enquiry into the resources of every country with regard to its horse population, and to the feasibility of supply in time of war. To know where to go when the necessity arises, and to have everything so cut and dried that remount operations can be immediately started, is a matter of prime importance.

I wish to make a strong point of our own country and our Colonies, because I consider therein lies our first line of supply in time of need—our vast Colonies, perhaps, more particularly, to which we can always go without let or hindrance, and to which we should first give our support and custom before going elsewhere.

I calculate that the equine population of the world is close on 80,000,000. The United States Department of Agriculture, a very go-ahead and up-to-date Department, computes the number at 75,000,000.

By continents, I estimate the number approximately as follows :—

Europe	...	40,000,000
Asia	...	11,000,000
Africa	...	1,250,000
America	North America, including Canada and Mexico ...	19,000,000
	Central and South America ...	6,000,000
Australasia	...	2,000,000
		79,250,000

Of the 40,000,000 horses in Europe, there are in :—

Russia (European Russia)	...	22,096,000
Germany	...	4,184,000
Austria-Hungary	Austria 1,711,000 / Hungary 2,309,000	4,020,000
France	...	2,900,000
Italy	...	742,000
Norway and Sweden	Norway ... 151,000 / Sweden ... 525,000	676,000
Denmark	...	449,000
Holland	...	285,000
Belgium	...	241,000
Switzerland	...	109,000
Portugal	...	220,000
Spain	...	397,000
Greece	...	100,000
Turkey in Europe	...	300,000
Bulgaria	...	344,000
Servia	...	180,000
Roumania	...	864,000
The United Kingdom of Great Britain and Ireland	...	3,000,000

RUSSIA.

Perhaps in no other country is more attention given by Government to the breeding of horses than in Russia. There are five Imperial and seven Military Studs. Of the Imperial Studs, there is a large one at Khrénovoi in the Don District, purchased from a descendant of the founder of the Orloff breed of trotting horses. This stud consists of saddle horses, trotters, and English thoroughbreds. The best mares here are said to be those got by Arab sires from English mares. Another large stud is the Belevodsk, embracing four establishments, viz. : (*a*) Derkoulsk, a very old stud, turning out carriage horses; (*b*) Streletz, devoted to Arabs; (*c*) Limarveo, also Arabs; and (*d*) Novo Alexandrov, for half-breeds. A third small stud is at Janow for half-breeds; a fourth at Orenburg for the breeding of Kirghiz, or Steppe horses.

Of the seven military studs :—

4 are in the province of Kharkoff, for half-breeds chiefly.
1 is in Voronej, for trotters and heavy draughts.
1 in Don, for Steppe and Oriental breeds.
1 in Poland, for half-breeds.

The above will show that there is a considerable infusion of English thoroughbred and Arab blood in Russian horses.

Private studs are very numerous. In the Don district alone there are 866 private studs, with 3,100 stallions and 101,000 mares, more than in all the rest of Russia.

Under the direction of the General Stud (Government) there are 27 stables or depôts, with 23,000 stallions for covering purposes in different parts of the country, and great improvement in local breeds has resulted from these.

The country is essentially one of riding and light draught horses. The Cossack district of the Steppes, with its breeds of Don, Kalmuck, Khirgiz, and others; the provinces of Poltava, Kherson, Kieff, Podolia, Volhynia, and Bessarabia, in South-western Russia, and Poland produce the riding horses. The provinces of Veronej, Orel, Koursk, Riazan, Toula, and Tambov produce the draught horses.

Compared with those of other countries, Russian horses generally are small, running chiefly from 14.0 to 15.1. Forty thousand were obtained for mounted infantry purposes during the latter part of the Boer War, and were well reported on. They possess great substance, good back and loins, deep girths, and are active and very hardy. Their common fault is sickle-shaped hocks. The Don horse is inclined to be long-backed, and shows travel sooner than horses from other parts. The prevailing colours in Russian horses are dun, chestnut, and grey, all real hardy colours. Russian cavalry remounts are chiefly drawn from the Don District, though the twelve regiments of Horse Guards are horsed from Imperial studs, as Steppe-bred animals are not strong enough to mount the men. Polish horses are not good; they are flat-sided, long-backed, and weak. There are three very hardy indigenous breeds in Finland, the best of which is the Savolaskokarel, 14 hands, strong, with short legs, but rough for riding. A common colour of this breed is a cream with black legs, mane, and tail (Isabelle).

The animal of all others in Russia that would take our fancy for mounted infantry purposes is the semi-wild horse of the Steppes, the Khirgiz pony, a nomad type, numbering several millions. They are found in Orenburg and Turgai, Akmolinsk, Semipaltinsk, and Semirichia of Asiatic Russia. Seldom over 14 hands, robust, straight back, broad quarters, rather short in forehand, short hard legs, small and hard hoofs, short coat in summer, thick coat in winter, cream, roan, light chestnut, dun, flea-bitten grey, can go for two or three days without water, and do long journeys, price £6 to £8 in his own district, sums up his description and character. Some of these found their way to South Africa during the war, and their journey to the port of embarkation, Fiume, is most interesting—six or eight days' journey by road to Orenburg, there entrained and taken to a station on the Volga (either Samara or Saratov), then placed in open boats and floated down the Volga four to seven days to Tzaritzan, thence by rail to Fiume, 3,000 miles, one month's travel. And of all Russian cobs they presented themselves for purchase in the best condition.

Russia could easily furnish eight horses to every man in its army. Most other countries could find but two.

GERMANY.

The good material of the country is appropriated almost entirely to supply the demands of military authorities, and the remainder may be said to be unfit for military purposes.

The chief aim of the Government Stud Department is to provide remounts for the army. The best remounts are found in East Prussia, Hanover, Oldenburg, and Mecklenburg, purchased at three years old, and kept in remount depôts for another year; the average price is £41 10s.

All horses, with the exception of those belonging to reigning families, foreign embassies, Government officials requiring them for their work, physicians, veterinary surgeons, and postal service, are liable to be requisitioned in time of war, and for this end an inspection takes place every eighteen months. Parish, county, and provincial lists are prepared, the horses being classified according to suitability for different branches of military service.

FRANCE.

Very little need be said of France from a supply point of view.

The principal horse-raising districts in France are :—

(1) The Departments of Basse and Haute Pyrénées in the neighbourhood of Pau and Tarbes, where light riding horses, 14.2 to 15.1, suitable for light cavalry and infantry, are chiefly bred.

(2) Normandy, the home of the Norman horse, chiefly draught, heavy riding (heavy cavalry and artillery), and a proportion of heavy draught; and

(3) Brittany (Finisterre and Côtes du Nord principally), with its strongly built, heavy draught Percheron in the north, and the small hardy Brittany pony, 14 hands, in the south.

Algeria is the cradle of the Barb horse, the points and quality of which are well known. He is essentially a riding horse, most suitable for mounted infantry, height 14.1 to 15 hands. The Department of Constantine contains the most, the Department of Oran a lesser number, and the Department of Algiers the least number. They cost the French Government £24 for troop horses, £35 for officers' horses.

AUSTRIA-HUNGARY.

So much was written and said about the Hungarian horse during the Boer War that he is already familiar to most of us. Bought by good judges, his appearance promised better success in the field, but events proved him soft, lacking in stamina and a subject of laminitis (the sequel of exhaustion).

Associating cause with effect, I have often asked myself the reason of this failure in our Hungarian friend; in fact, in all horses that were weighed in the South African balance and found wanting; and I find that, apart from the transportation from a northern zone to a southern zone, or from one country to another, thereby necessitating acclimatisation, the horses that proved themselves the worst campaigners were those that were not grain-fed animals in their own country, and therefore had no bottom in them to begin with.

The ground-work of Hungarian horses is English thoroughbred, Arab, Anglo-Norman (Nonius), Lippieza (Austrian) blood (a mixture of Spanish and Arab), and Norfolk trotter strains. The average height is 15 to 15.1. Good-looking, glossy coats, good manners, rather light but clean legs, well set on head, back inclined to be long, shoulders straight, narrow in front and behind, is a general description. All go in harness in pairs in light four-wheeled carts; the foal at a fortnight old may be seen strapped to its mother's breast harness. They are generally put to light harness at 2 years old. The Hungarian peasant does not ride.

Remounts are usually bought direct from owners in the autumn at 3½ years, the price being £27. A reserve of over 10,000 trained riding horses is maintained, the horses being farmed out with responsible people, and called up for six weeks' training of reservists each year.

Under the heading of Austria, I should like to mention Bosnian ponies, found in great numbers in the mountain districts of Bosnia. Though ugly, they are good, docile, hardy, substantial, blocky ponies, with good backs and broad quarters, and useful for pack purposes. Their usual load is 2 cwt. up and down the mountains. Their average height is 12.2 to 13 hands. They were bred originally from Arab blood, introduced by Turkish officials. About £10 or £12 would land them in England—probably 1,500 available.

ITALY.

The ordinary Italian horse is a weedy, undersized animal, prematurely exhausted by overwork at too early an age.

The Maremma district of West Tuscany (Province of Grosseto) is the best. The Maremma horse is a stout, ugly, wiry animal, about 15 hands, bred on the wild system. They apparently enjoy great favour in the Italian army, and many of the horses used in Rome, especially in omnibuses and cabs, hail from this district.

In the island of Sardinia is a small, hardy, quick, and easily trained horse. The Italian Government sends an Army Commission there every year, and the best of the colts, 14 hands and over, are bought up young. Anything seen over six years old is worn out.

NORWAY AND SWEDEN.

Scandinavian ponies are rough, sturdy, docile animals, the original stock still found in the forest-lands of the north being probably of Tartar origin.

DENMARK.

Danish horses are good, light draught horses, long in the back as a rule, and slow, but, having good legs, they stand a good deal of knocking about.

THE NETHERLANDS.

The native horse is wanting in stamina, and remounts for Army are obtained from Ireland.

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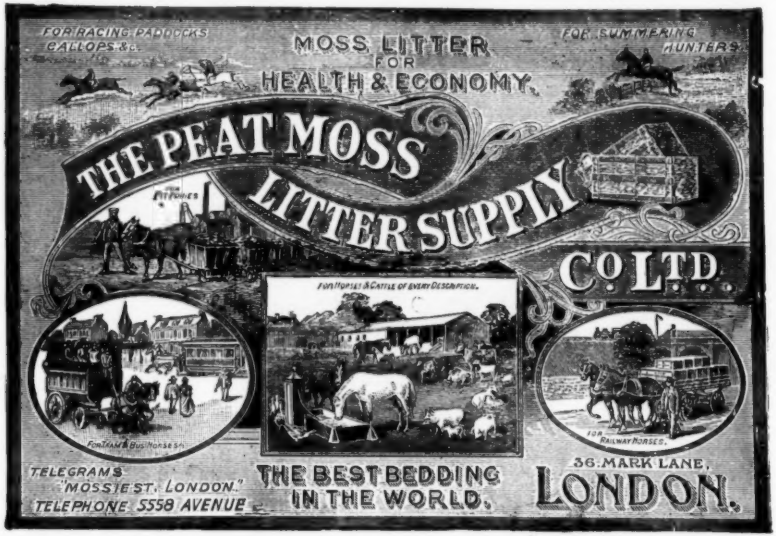
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BELGIUM.

The type of horse generally raised in Belgium is a heavy animal, known as the Flemish Horse" in his heavier form, and as the "Ardennes Horse" in a somewhat lighter form. The latter, bred in the Ardennes district, is a strong, compact horse, admirably suitable for artillery and draught purposes. The artillery and transport horses of the Belgian army are all drawn from this district, the cavalry horses being imported. Germany buys on an average 21,000 horses from Belgium annually.

SPAIN.

The horses of Spain, descendants of Barbs, as a rule are honest little animals, but lack stamina. They are only suitable for light draught and mounted infantry. The Spanish Remount Commissions take the pick, purchasing, at 3 years old, at £27.

PORTUGAL.

Horse-breeding in Portugal is at a very low ebb, and 75 per cent. of the horses of the Army are obtained from Spain.

SWITZERLAND.

There are not enough horses in Switzerland to supply the needs of its own army, and about 800 are imported annually, chiefly from Ireland, Northern Germany, and Hungary. These are issued by remount depôts to the men of the Elite, who pay half the appraised value. They use them in their private occupations, usually taking great care of them, and have 10 per cent. of what they paid refunded annually. The system is quite unique.

ROUMANIA, BULGARIA, SERVIA, GREECE.

Roumania and Bulgaria obtain most of their army horses from Hungary and Russia; Servia from Hungary. The native ponies of these countries are only fit for pack and train purposes. Greece also obtains its supply from Hungary.

OTTOMAN EMPIRE.

The stamp of horse to be found throughout the Turkish Empire is best suitable for light cavalry and mounted infantry, especially the latter. In the Turkish service many of the cavalry and nearly all the artillery are from Hungary and Russia. Local horses have been tried for artillery in Turkey in Asia, but they are incapable of drawing heavy weights over rough ground.

Speaking generally of ponies of European Turkey, they are weedy and undersized, and not worth purchasing for military service.

PERSIA.

The breeding is chiefly in the hands of nomad tribes, who follow the same methods of breeding as Arabs in Mesopotamia, but in all these districts the numbers available are less than formerly. Speaking generally, the horses are mostly of the native Indian cavalry or mounted infantry type.

CHINESE EMPIRE.

The Mongolian pony is from 12.1 to 13.3 in height, with an occasional 14.1. They are hardy, can live in the open in all kinds of weather, and are up to great weight compared with their size. Though trained in a rough way, they require a good deal of handling and riding before becoming handy and reliable; they are very slow. In 1900 the Indian cavalry, mounted on 14.0 to 14.2 Arabs, rode down the Chinese on Mongolian ponies in a very short distance.

JAPAN.

The animals of the country are poor-looking ponies, 13.2 to 14.2, with straight shoulders, narrow chests, drooping quarters; but they are tough, and need little care.

Three principle types are noted :—

1. The Kiushiu-Satsuma horse, which has a strain of Arab blood.
2. The Yezo horse, said to be the best, and which forms the chief remount.
3. The Nambu horse, a capital draught animal.

It was remarked of Japanese cavalry horses with the Allied Forces in China, in 1901, that they were an uneven lot of country-breds, 14.1 in height, with large plain heads, heavy chests, long legs, all stallions with a distinct cross of American trotting blood. They looked hardy and useful.

XUM

The transport animals were all stallion ponies. They were harnessed to a light framed cart with low wheels, a man to each pony. They worked hard and kept in good condition, but screamed and fought along the line of march.

THE NEW WORLD.

To-day the Americans possess 25,000,000 horses, distributed, roughly, as follows :—

North America, including U.S.A., Canada and Mexico	19,000,000
Central and South America	6,000,000
	25,000,000

By far the greatest number of the above—at least 17,000,000—are located in the United States of America, and it is of this country that for the present I wish to speak. Canada I purpose dealing with afterwards, under the heading of "Horses of the British Empire."

In point of numbers and general excellence, the United States in a matter of horses scarcely has its equal. Beginning in the early days of colonisation with importations of European stock, chiefly from England, the Netherlands, and Canadians of French origin, subsequent crossings with the English thoroughbred, and grading up with home productions, the present-day American horses may be considered distinct in types, and creations of the country. Even the original Cayuse or broncho was improved in the early history of American horse-breeding by the use of thoroughbred and hunter sires, the progeny being small, but of excellent stamina.

At the present time the visible supply of desirable horses for all purposes of four and five-year-olds is estimated at about 100,000, hardly, some say, enough to supply the average demand, but young animals are much more plentiful throughout the country, and with the increasing demand and interest that has been raised in breeding good animals which can readily be sold, the supply should be more ample in the future.

Texas bears a great name for horses, and produces them in great numbers. The best class, and the most numerous, is the cob, 14.2 to 15.0½, lighter in build than the average horse of the same height in Great Britain, but showing more breeding. He is, as a rule, ugly, long, narrow, and flat-sided, but his speed, hardihood, and endurance are phenomenal.

The North-western States of the Union, viz., Washington, Oregon, Idaho, Montana, and Wyoming, present a large breeding district, and is the home of the "range horse."

Range or ranch horses of the present day comprise :—

(1) Ponies, standing up to 14.2, descendants of the ancient stock that is known by the names of Cayuse, Indian pony, or mustang; of great endurance. useful for herding cattle, and furnishing good material for polo.

(2) Saddlers and drivers, 14.2 to 15.2, crosses of coach, standard bred, and thoroughbred, and representing what the range is capable of producing in the way of horses.

(3) Draught grades, chunks, 15 hands and upwards.

They are all branded. The prejudice against a branded horse is not so strong as formerly. The evil disposition of the old range horse, or broncho, and his individuality is being greatly improved by the more progressive ranchmen. Close communication with men, better methods of handling, and the infusion of good blood from the Eastern States and Europe, are all producing great changes, while the wonderful quality and endurance of the native stock is retained. Bred in mountainous regions, at an altitude of from five thousand to ten thousand feet, accustomed to fend for themselves, they are a survival of the fittest. So hard is their lot in winter that it is not uncommon to find many of them with the tips of their ears frozen off. My experience of range horses is that no idea of their quality can be formed by looking at them from a distance; it is necessary to get close up to them, to get into the middle of a herd of them, to see the strength and stoutness of back and loins through their roughness. They require handling with care at first, but they are readily broken in. In estimating the potentialities of the U.S.A. for horses for military purposes, the range horses must not be lost sight of. They are an improving stock, and, moreover, they have cheapness for their recommendation. Quite a large number of them were bought by our Government during the Boer War. The United States is often supplied with them for cavalry, and quite often branded horses are found in export stables.

The enormous trade in horses is done through stock-yards or markets in large towns. The principal are Chicago, St. Louis, Kansas City, Omaha, Buffalo, St. Joseph, Indianapolis, and New York.

The British Government during the Boer War purchased 107,511 horses and 80,521 mules. The system of purchase adopted was the placing of orders with approved agents. To purchase at auctions would have been impossible. The purchase grounds lay chiefly west of the Mississippi, and the horses selected were almost entirely of the riding classes. They were very favourably reported on in South Africa, particularly the mounted infantry cob.

Though my paper relates only to horses, I am loath to close my altogether inadequate remarks on the U.S.A. without making mention of the American mule—peer of mule kind—the most handsome, hardy, useful, and satisfactory animal extant, and of greater average value than horses in his own country. From the small miner, 12.3 to 13 hands, to the magnificent, heavy sugar mule, 16.2, he is bred in Missouri and contiguous States, also in Texas, and his market is for mines, lumber trade, and the cotton and sugar-fields of the south. I take off my hat to the St. Louis mule that was regularly hunted with one of our best English packs some few years ago. Truly, he was worthy of the honour of a pink coat.

To-day there are about 2,750,000 mules in the United States. The British Government purchased 80,524 for South Africa during the war, and the supply was going strong at the end.

MEXICO.

From a remount supply point of view, the country cannot be considered of any practical value to us. The equine products, Spanish in origin, are ponies of the average height of 13 to 14 hands, occasionally running up to 14.2. They are light, shelly beasts as a rule, value, £5 to £10, but very hardy and good stayers.

ARGENTINE.

Of the South American Republics, the Argentine is by far the most important, containing 4,500,000 horses. In point of numbers it is very rich and resourceful, but I am sorry to say that the reputation the Argentine horses enjoyed in the South African War was not of a savoury character, and experience of them showed that they were not equal to the vicissitudes of a campaign. Soft-hearted, incapable of effort, lacking in stamina, were the common reports of them. This is disappointing, because in their own country the Criollio, or small native horses, bear a good name for endurance, going long distances without being exhausted. It is an acknowledged fact that they will canter a distance of 80 to 90 miles a day carrying a man and a recado (native saddle weighing 60 to 100 lbs.) This may be true of some, but the fact remains they did badly in South Africa, so badly, indeed, that purchase was suspended in October, 1900, after about 26,000 had been bought. This failure is, moreover, unfortunate, as the country offers a good and ready field for large numbers of animals of the mounted infantry and light cavalry stamp. Various reasons have been assigned for the failure, such as "want of acclimatisation," "lack of stamina or 'bottom,'" partly inherent, but also consequent on the heart-breaking methods of breaking-in, and an entire subsistence on a grass diet. I am strongly of opinion that the last was the cause. I do not think that any entirely grass-fed animal is fit for the active service of a campaign. And of all horses I have ever met, the Argentine is by far the slowest at taking to a grain diet. He will sulk and leave it for days. I accompanied a shipment from Buenos Aires to Durban in 1898, and I well remember the difficulty we experienced in this respect. They would eat alfalfa by the ton, but would turn their noses up at our trials of oats, bran, and maize. Another feature of the Argentine horse is that he is a very home-sick animal. Take him from his friends of his Tropilla, and you find him grieving at the change for a long time afterwards. Many of the Criollio horses are badly coloured animals, with blazed faces and four white legs—always, to my mind, indications of a soft and inferior-bred animal.

The Argentine horse is essentially a riding horse, and for riding purposes he is chiefly used in his own country.

The number purchased by the Commission from November, 1899, to October, 1900—viz., 25,932—would appear to be about the available annual supply of trained animals. They would be suitable for mounted infantry or light cavalry. If unbroken animals, or potros were taken, the supply would be much increased. The value of broken animals is from £5 to £8.

CHILI.

Chilian horses have a great name for hardihood. They are similar to the Argentine, but stronger-looking, better broken, and more care is taken of them. Some of them were purchased by the Argentine Commission in 1900; they travelled well to the port of Buenos Aires, a long distance, but thay were mixed up with the Argentine horses and suffered in the general condemnation.

XUM

BRITISH EMPIRE.

Commensurate with the other empires and countries, we are sadly deficient in total numbers of horses. I wish particularly to emphasise this. For the whole of our Empire we have only about 8,000,000. In comparison to this I will only quote two countries, viz., Russia, with 23,000,000; the United States of America, with 17,000,000. (N.B.—The U.S.A. census of 1900 says 21,000,000.)

Our 8,000,000 are distributed as follows:—

The United Kingdom	3,000,000
Australia	1,625,000
New Zealand	287,000
India	1,343,000
Canada	1,500,000
South Africa, including Natal	250,000
Jamaica	47,000
Mauritius	12,000
Malta	8,000
Newfoundland	6,000
Ceylon	4,000
Falklands	3,000
	8,085,000

UNITED KINGDOM.

The number, 3,000,000 quoted by me, is only approximate guesswork. I think it speaks rather badly of whatever Department is charged with the census of animals that more reliable data are not furnished. The Board of Agriculture Returns, which enumerate agricultural horses only, leaving unnoticed the horses used in commerce, trade, &c., give a total of about 2,011,000. Our army horses number 33,172 (estimates 1903-4), and a fair computation of 955,000 for horses engaged in commerce, trade, &c., would make the approximate number up to 3,000,000.

It is in our colonies that we are deficient in horses, not only in numbers, but to a great extent in quality, and to this our urgent attention is demanded. We require greater numbers there; we are in need of better fields of supply in times of need, enabling us in such times to be independent of other nations, or at any rate, to first draw on our own Dominions, giving them our custom.

We are much too prone to accept the view that methods in practice on the Continent are superior to our own. I venture to assert that the average British farmer will give points to any Government breeding establishment on the Continent in the matter of breeding of horses and the stock raised. Why do the Continental Powers come to us in England and Ireland for horses if it were otherwise? We find representatives of *every* country coming to Ireland, whose horses are essentially of a riding and light draught type. A market is thus maintained, and you have supply to meet it. We hear a terrible outcry that the foreigners take the best horses out of the country, and that we ought to take steps to prevent this. I affirm this is a mistake, and I assert that they do good instead of harm by their coming; and I am of opinion that we should encourage them to come, and ask their friends to come, because they create a market, and an improving market, which will always redound to our profit and advantage. If at any future time, when there is urgent need, the horses will be there, and we will have first call.

CANADA.

During the Boer War 14,611 horses were drawn out of Canada by the Remount Commission. It would be difficult to obtain the same numbers on emergency at the present time. One competent authority estimates the supply of good suitable horses for Army purposes at 2,000 per annum, the chief number being obtained from Eastern Canada. However, if the North-West and British Columbia were exploited, I am confident this number could be increased. Every facility for shipment east or west exists, and trans-continental transportation is easily effected.

I am certain that all of us who have served in India and cultivated there a liking for our friend "the Waler," were grieved at the bad reports on him in South Africa. Personally, I have the greatest love for Australian horses; I was much associated with them during the six years of my service in India, and I have no hesitation in saying that the horses of the Horse Artillery there are second to none in the world—at least, this was so in the 'nineties, when I knew them. I may say the same of the medium cavalry and horses of the charger and hunter type to be found in the private market, the latter always being worth 1,000 to 1,200 rupees. I should like to say so much and more in defence of Australian horses. We cannot afford to allow so good a field of supply to lapse, or to suffer one so conveniently placed to India and the Eastern portions of Asia to fall into disuse.

NEW ZEALAND

The horses of New Zealand resemble English horses, and they are generally nicely broken, but the numbers available are not great.

INDIA.

India will produce horses readily enough, but the climate and conditions of life militate against size and substance. The general purpose animal is a pony, and the majority of the animals of the country are of this class. It is satisfactory to note that some of the old breeds, such as the Beloochi and the Kattiawar, are being revived, and we must not forget the sturdy, hardy, small Burmese ponies, to improve which by any foreign importation would be absurd. The resuscitation of these hardy breeds of small horses, and the encouragement given to their production to better type, is certainly a step in the right direction. The more useful animals we can stock the country with the better, and to this general end the horse-breeding operations cannot fail to be conducive to great good. In any war in India it would be found that the animals bred in the country, no matter of what size and substance, will stand the vicissitudes of a campaign much better than imported material. It can never be said of India that it is a country in which foreign animals quickly acclimatise. The enervating influences of climate are against this. So let us take care of our native and country-bred stock and grade it up to a better standard generally, in view of the greatest possible supply in time of necessity.

The Indian Army in times of peace requires nearly 3,000 remounts. These are furnished from country-bred stock and importations from Australia, Arabia, and Persia, light cavalry being mounted on country-breds and Arabs, medium cavalry on Australians, and the artillery being horsed by Australians. In times of active service, the country, with its 1½ millions, supplemented by the more easily acclimatised Arab and Persian horses, would be equal to the mounted branches of the Service.

SOUTH AFRICA.

This brings me now to the consideration of South Africa. The war left the whole country in a very denuded state. Previous to hostilities there were 387,000 horses in Cape Colony alone, 54,000 in Natal, and a very considerable number in the Free State and Transvaal, chiefly of a light cavalry, mounted infantry, and light draught type, excellent small animals that withstood the hardships of the campaign better by far than any other horses. The mortality in horses during the war, I may mention, is roughly estimated at about 340,000. To-day probably 250,000 will cover the total number in all the States, but we have left as a legacy the chance of the world in establishing a race or races of horses, an opportunity the like of which has never before been presented to any country, and which now rests in the hands of administrators to make or mar. It is a case of beginning again, but the beginning is replete with great possibilities. With a foundation stock drawn from the best countries in the world, and a country pre-eminently suited in climate and soil for the raising of good, healthy, hardy animals of any type, I cannot imagine a fairer promise. It is to be hoped that future prosperity will mature this promise, bringing success to the horse-raising industry, and that in time our dominions in South Africa will show us in horses an asset of Empire, the real value of which can best be appreciated when there is a call to arms.

REGISTRATION.

To meet the immediate requirements on mobilisation we have registration of 20,000 trained horses of different kinds at 10s. per horse per annum, most of which number belong to the large commercial firms in London. There is a diversity of opinion as to whether this registration is worth the cost, and whether, by offering a good price when mobilisation is required, horses could be obtained from large firms just as easily without resorting to the enormous expenditure entailed in registration. In any case, there would appear to be necessity for modification. It is possible that registration might be made general throughout both Great Britain and Ireland, that it might be done through county and municipal authorities in conjunction with officers appointed by each army corps or command. This registration would show classification as to suitability for each branch of the Service as far as possible, and it need not interfere with the floating horse population of export, sales, &c. By this means also contagious diseases in horses would be kept in good control, if not eradicated altogether. Needless to say, no retaining fee for registration would be paid, but the alternative of a good price could be relied on to induce owners to sell when mobilisation was required. The main thing is to know where the horses are.

XUM

Translations and Extracts.

TRYPANOSOMA.

BY M. A. LAVERAN, MEMBER OF THE INSTITUTE OF THE ACADEMY OF MEDICINE, AND M. E. MESNIL, DIRECTOR OF THE LABORATORY OF THE PASTEUR INSTITUTE, PARIS.

One volume; 417 pages; 61 illustrations; one coloured plate. Paris: Masson and Co., 1904. Price 10 francs.

The book is published at an opportune moment. Trypanosomiasis has lately acquired the highest interest in veterinary medicine, and appears to be acquiring an equal one in human medicine. In 1841 the trypanosoma was first discovered in the trout by Valentin, and in 1880 by Evans as the cause of surra in horses and camels in India. Since then the matter had not been studied seriously, but the discovery in 1894 by Bruce of the trypanosoma in African Nagana and its transmission by the Tsetse-fly has given it a fresh interest.

The book consists of sixteen chapters, and the chief subject-matter of each has been noticed. The three first are devoted to a short material sketch of different outbreaks over the world and the *technique* of the study of these parasites, with their morphology biology.

Chapter IV. deals with the Trypanosoma Lewisi of the rat, which is the most common and easily studied form. The authors have most painstakingly studied the process of agglutination of this parasite, with the modes of infection and immunisation of different animals.

Chapter V. deals with the forms seen in small animals.

Chapter VI. of Nagana and allied African forms of the disease due to one or more species of Tsetse-fly (*Glossina*).

The authors have classified the different animals according to their susceptibility:—

(1) Animals in which the course is acute. Mouse, grey rat, water-rat, marmoset, hedgehog, dog, monkey.

(2) Subacute. Rabbit, guinea-pig, field-mouse, dormouse, hare and pig.

(3) Chronic. Bovines, goats, sheep. Man, fortunately, is immune.

Novy and McNeal have with some difficulty cultivated the trypanosoma of Nagana like that of the rat. The best results have been obtained with a mixture of two or three parts of blood to one of gelose.

Large game and various wild beasts which are infected to but a slight degree form a constant supply of the virus which is conveyed by the Tsetse-fly to domestic animals.

Arsenic, trypanroth and human blood serum have a certain degree of activity against the trypanosoma of Nagana, but in reality very little is known as to the cure or prevention of the disease, and sanitary measures are all that can be relied upon.

The authors discuss certain other African diseases allied to Nagana:—

(1) A trypanosoma of German East Africa that attacks oxen and donkeys, and which has been studied by Koch.

(2) One affecting hares, donkeys, and oxen in the Togo hinterland.

(3) Trypanosoma other than that of Dourine observed in Algeria by Chauveat, Szewzyck, and Rennes in hares, and that of the dromedary (*El debab*) described by Sergant.

(4) The trypanosomata of the Soudan (*M'bori* of the camel and *Soumaya* of bovines of Cazalbou).

Chapter VII. The trypanosomiasis of horses in the Gambia, discovered by Dutton and Tod, caused by the Trypanosoma dimorphon, a parasite that is divested of a free flagellum.

Chapter VIII. Surra due to the Trypanosoma Evansi, which is seen in horses and camels in Northern India, Bombay, Burma, Southern China, French Indo-China, Sumatra, Java, and the Phillipines. Although in India bovines seem to be comparatively immune, there has within the past three years been a heavy loss amongst them in Java and the Mauritius. On one occasion Laveran and Mesnil have cultivated the parasite on blood and gelose. Infection appears to be due to stinging flies, Taons and Stomoxys, and like Nagana, there is no therapeutic agent of any use. Lingard has recently described a trypanosoma in the blood of Indian oxen.

Chapter IX. Mal de caderas, caused by the Trypanosoma equinum, almost entirely confined to equines in South America. The valuable work done by M. Lignieres in connection with this disease is well known; it appears to be conveyed by flies, Taons and Stomoxys.

Chapter X. is devoted to Dourine, caused by the Trypanasoma Equiperdum and is conveyed during coitus. The disease has lately been studied by Rouget, Buffard, Schneider and Nocard. A similar disease exists in hares at Soemedang (Java).

Chapter XI. Galziekte of bovines in South Africa, caused the Trypanosoma Theileri, a large parasite conveyed by the hippoboric.

Chapter XII. Human trypanosoma or sleeping sickness, caused by the Trypanosoma Gambiensis prevalent in certain parts of Equatorial Africa, especially the west, but which is rapidly spreading in the east. It appears to be transmitted by the Glossina Palpalis. It is always fatal.

The four last chapters are devoted to the trypanosoma of birds, reptiles, bactrians and fish. It is curious to remark that the spermatozoa of certain bactrians closely resemble trypanosoma: in an appendix there is a description of the tsetse-fly, with a coloured plate of the various sorts known.

This review will show the importance of the subject matter contained in the book. The description is precise, clear, and to the point, and the figures well executed.

The book to anyone who is residing in the Tropics and who can read French is one that we can confidently recommend; we have derived much benefit and increased our knowledge by perusing its pages.

XUM

LOCO WEED DISEASE OF SHEEP.

DR. MARSHALL.

DR. MARSHALL took part in an expedition sent out by the United States Department of Agriculture during the Autumn of 1903 to investigate the loco weed disease in Montana.

Loco disease is a disease affecting horses and sheep and occasionally cattle and goats. The victims are supposed to be poisoned by the loco weed, for which they form a preference, eating the weed to the exclusion of other diet. *Astragalus molissimus* and *Aragallus spicatus* are the two commonest loco weeds. Accessory factors are considered of great importance by the ranchers. (1) Age. Almost without exception the disease appears before the end of the second year. (2) Insufficient food is frequently the important predisposing factor. (3) Insufficient supply of water is equally important. Lack of salt is considered by many ranchers to be the most important of all predisposing factors. Many think that if animals are well supplied with salt they will escape loco disease altogether. (5) All ranchers agree that *healthy animals never acquire loco weed disease. A lowered state of vitality is always a precursor of loco weed disease.*

This malady has been known for fifty years or more. It was first recognised in Mexico or Texas. It gradually spread north and reached Montana about ten or twelve years ago. It is found from Western Kansas to California on the prairies and foot-hills at an elevation of about 4,000 to 6,000 or 7,000 feet.

The incidence varies from year to year. In affected regions from 10 to 25 per cent. of the annual increase die from this cause. The disease spreads in epidemic manner, appearing first, as a rule, not sooner than ten or fifteen years after a region has been settled. The disease appears in early spring and late autumn. The symptoms come on insidiously. Tame, well-broken animals become unmanageable. Defective vision, mental and nervous symptoms develop. Ultimately the victim emaciates, eats nothing except loco weed, in the search for which he spends his time, and after a long period, usually months or years, dies from weakness or intercurrent disease.

The only "locoed" animals that could be found on the recent expedition were sheep. About 1,000 "locoed" sheep were seen on different ranches, from which number reliable and experienced rangers selected a few of the sickest and most typical "locoed" animals for study. Experiments indicated that these "locoed" sheep did not prefer a diet of loco weed to one of grass or alfalfa. Feeding experiments caused no new symptoms. The symptoms were not alike in all cases. All of the cases were in lambs or yearlings; all were undersized, emaciated and weak, with stilted gait, drooping head and dull eyes. Sensation, sight, hearing, &c., appeared normal. Many of the "locoes" showed defects in the incisor teeth. In one or two flocks large numbers of animals were afflicted with bronchitis, conjunctivitis, &c. Usually the fleece was rough. One animal had a muscular tremor. Autopsies were held upon the freshly killed animals. Tissues were fixed in Zenker's fluid and examined microscopically. No anatomical evidence was found of injury produced by the loco weed. In every case the sheep were infected with from one

to five parasites. The parasites found were: (1) *Thysanosoma actinioides*, or "fringed tapeworm," obstructing the bile ducts in nine cases; (2) *Haemonchus sp.* in the fourth stomach in four cases: this worm, which appears to be a new species similar to the *Strongylus contortus*, is being worked up by the United States Bureau of Animal Industry; (3) *Metastrongylus filaria* in the bronchioles in five cases; (4) *Sarcocystis tenella* in the muscles in seven cases; (5) *Cysticercus tenuicollis* adherent in peritoneal cavity in five cases; in one of these cases a cyst was also found free in the pericardium. Dr. Chas. W. Stiles kindly identified the worms for Dr. Marshall.

In addition, an extradural basilar abscess was found in the animal which exhibited muscle tremor. These results were obtained from eleven complete autopsies. Many other partial autopsies gave the same results. The "fringed tapeworm" produced a dilatation of the bile ducts and often of the pancreatic ducts, and there was strong evidence that it also produced occasionally an obstructive biliary hepatitis.

From its resemblance to *S. contortus* it seems probable that the Haemonchus is a dangerous enemy to the sheep. Its exact action could not be determined, but it evidently is less virulent than the *S. contortus*.

The *Metastrongylus filaria* was found in all of the cases with bronchitis, conjunctivitis, &c. The *Sarcocystis tenella* was found in every case in which the tissues were studied microscopically. Apparently it is harmless, as is the *Cysticercus tenuicollis*.

After a discussion of his findings and of the data obtained from the literature and from the ranchmen, Dr. Marshall concluded that the evidence indicates that there is no true loco disease of sheep produced from eating the weed, but that so-called "locoed" animals suffer from bad feeding, insufficient care, and a variety of other diseases, the most important of which are the parasitic diseases.

(Johns Hopkins Hospital Bulletin.)

CASE OF HYGROMA OF THE POLL.

M. LEON DUPAS, VETERINAIRE EN 2IÈME 31ST REGIMENT ARTILLERY.

THE patient, 15 years old, was admitted to the infirmary on January 4, 1901, with two cystic tumours on the neck.

They had first appeared eighteen months previously, and were each side of the neck separated by the mane. They were ovoid in form the anterior border of each being on a level with the strap of the head collar a few inches from the root of the ears, the one on the left side was $4\frac{3}{4}$ inches long, that on the right $9\frac{1}{2}$ inches.

They were quite painless. When the head was flexed they were hard, tense, and prominent, when it was extended, fluctuating, and evidently communicating with each other, and they were diagnosed as large hygroma of the neck.

XUM

to great depression. The temperature during these attacks is 40° or over, and is a certain indication, but the attack subsides in twenty-four hours, and the animal resumes his normal condition.

In the naturally acquired disease it is difficult to determine when the symptoms first appear, but the first usually noticed is a weakness of the hind quarters, and a slight staggering when moving, which gradually increases, the point of the hind toes being dragged along the ground, and giving rise to the local designation, mal de caderas, or disease of the quarter.

As the case progresses there is difficulty in remaining standing. If stabled, the animal supports himself by his head and quarter against the wall or manger; if outside, and he can find nothing to lean against, he stands with his fore-legs stretched forwards and the hind ones straddled apart, but, finally, falls down. He has difficulty in getting up, only to again fall down. Death does not take place at once; if the animal can feed he may live for some days, but as the majority of cases take place in horses running out in the "camp," they perish from starvation and thirst. No matter how well cared for, however, general paralysis sets in, and the animal remains recumbent on his side, with his head and neck stretched out, till he dies, although from time to time he may make some convulsive struggles, raise up his head and neigh. Death generally takes place two or three days after falling down, in some instances in a condition of deep coma. Recoveries are exceedingly rare, so much so, that the authors say they have never seen one, and doubt if the reputed ones are true mal de caderas.

The paroxysms of fever are intermittent, especially at the commencement; the morning fall of the thermometer being very well marked, the maximum being 41° to 41·8°, minimum 35° to 36° C.

In the earlier stages there is albuminuria, the urine being thick and oily in consistency, of a dark yellow colour; in some cases there is hæmaturia, which may be so excessive that the urine resembles pure blood.

An eruption appears on the skin of the neck and quarter in the shape of patches, three to three and a half inches in diameter, over which the skin is thickened, red, and covered with fissures and slightly adherent scabs. There are subcutaneous exudation over the articulations, the lower surface of the abdomen, inside the thighs, and into the eyelids. There are conjunctival œdema and conjunctivitis, with white irregular patches of opacity on the cornea, particularly over the lower part.

The appetite remains good up to the last, but the progressive paralysis of the sphincters give rise to incontinence of urine and fæces. The duration of the disease, from the first appearance of symptoms of paralysis, varies from eight days to one or two months, and in exceptional cases, more.

A chronic form is also seen, locally known as "Baacypoy," or "chronic emaciation." It is characterised by great and progressive loss of condition, till at last the animal has a mummified appearance, but there is no locomotive derangement. The ranchmen look upon this chronic form as a special disease, although they all allow that it terminates in mal de caderas. It is, however, the same disease in an attenuated form, and the specific trypanosoma is invariably present in

the blood. It is as fatal as the acute form, but it has not yet been determined if this special type is due to an attenuation of the parasite, or to greater power of resistance of the patient.

Post-mortem Appearances.—There is sero-fibrinous exudation into the peritoneum, pleura-pericardium, and the articulations. Most of the organs and especially the spleen are injected and turgid, the lymphatic ganglia are hypertrophied and enlarged, with blood extravasations in the kidneys. There is diffused interstitial hæmorrhage, with either acute or chronic parenchymatous nephritis; the nerve centres seem to be healthy.

The authors have lately seen a case in which the typical course of the disease was complicated at the beginning by convulsions, tremors, and epileptic fits, with spasms of the muscles of the face and neck that lasted from five to ten minutes, and were repeated four or five times in the twenty-four hours, lessening as the paralysis progressed. In addition to the specific trypanosoma of mal de caderas, there were giant cells found in the blood, pointed at one end and slightly curved or rectangular at the other, measuring 60 μ by 8 μ to 10 μ. There was a distinctly marked limiting membrane containing four to six square nuclei.

The paper terminates with some experiments as to the susceptibility of different animals, which the authors state to be:—

Very Susceptible.—Monkey (*Nictipitheous felinus*), grey and white mice, white rat, carpincho (*Hydrochoerus capibard*).

Slightly Susceptible.—Guinea-pig, rabbit, dog, cat.

Refractory.—Sheep, ox, pig, birds.

(*Annales de l'Institut Pasteur*, April, 1903, p. 241.)

SPONTANEOUS CURE OF TETANUS.

M. BERGEON, AIX (BOUCHES DU RHONE).

A TWO-YEAR-OLD colt was castrated by a gelder, who after removing the clamps recommended the wound to be washed with dish water, "to quicken the healing." A short time afterwards the owner found the animal quite stiff, and refusing all food. The gelder was again consulted, and diagnosed the case as one of "chill of the brain." He amputated the tail, put a sack of hot chaff over the head and neck, and passed a seton in the chest. He was then seen by a farrier, who recognised it as being tetanus and advised that M. Bergeon should be called in, who put the animal in a dark, quiet horse-box, in slings. The wounds in the scrotum were disinfected by the injection of a 2 per cent. solution of chloride of zinc. He was given gruel, *ad lib.*, and enemata of milk and hay tea.

On the eighth day the stiffness had greatly diminished, and the patient able to drink gruel and milk freely. In a month he was cured.

M. Bergeon considers that if tetanus is curable, it is by *vis natura*, and not any therapeutic agent.

(*Revue de Toulouse*, November 1, 1904.)

Reviews.

TUSON'S VETERINARY PHARMACOPŒIA. Sixth Edition, 1904. Edited by JAMES BAYNE, F.I.C., F.C.S., late Professor of Chemistry and Toxicology, Royal Veterinary College. 376 pages. J. and A. Churchill, 7, Great Marlborough Street. 7s. 6d.

Tuson's Pharmacopœia is a household word. The work was first published in 1869, and has run through six editions. The present one adheres to the original plan of Professor Tuson, and, as the editor in his preface states, has been as nearly as possible brought into line with the British Pharmacopœia of 1898.

A certain number of new drugs and preparations have been added; and no doubt the editor has his reasons for leaving them out, but we notice that certain have been omitted, such as picric acid and adrenalin. A table showing the comparison of the Fahrenheit, Centigrade, and Réaumur scales would also be useful. The popularity of the book amongst veterinary students, however, has been proved by the test of time and the demand for another edition.

Books and Periodicals, &c., Received.

Fortschritte der Veterinär Hygiene, December, 1904; Bulletin Veterinaire, December, 1904; Revista de Medicina Veterinaria, December, 1904; Deutsche Tierarztliche Wochenschrift, December, 1904; Berliner Tierarztliche Wochenschrift, December, 1904; Revue Générale de Médecine Vétérinaire; The Agricultural Journal of the Cape of Good Hope, December, 1904; Illustrated Kennel News; Irish Farming World; Trade Press List, December, 1904; The North British Agriculturist Calendar; Reports of the Special Committee on the Breeding of Hunters, Hunters' Improvement Society; Tuson's Veterinary Pharmacopœia; Johns Hopkins Hospital Bulletin; Rhodesian Agricultural Journal; Recueil de Médicine Vétérinaire; l'Echo Vétérinaire; Il Nouvo Ercolani; Clinica Vétérinaira; Trypanosoma, A. Laveran and E. Mesnil; Toy Dogs: Their Points in Health and Disease, Frank T. Barton, M.R.C.V.S.

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